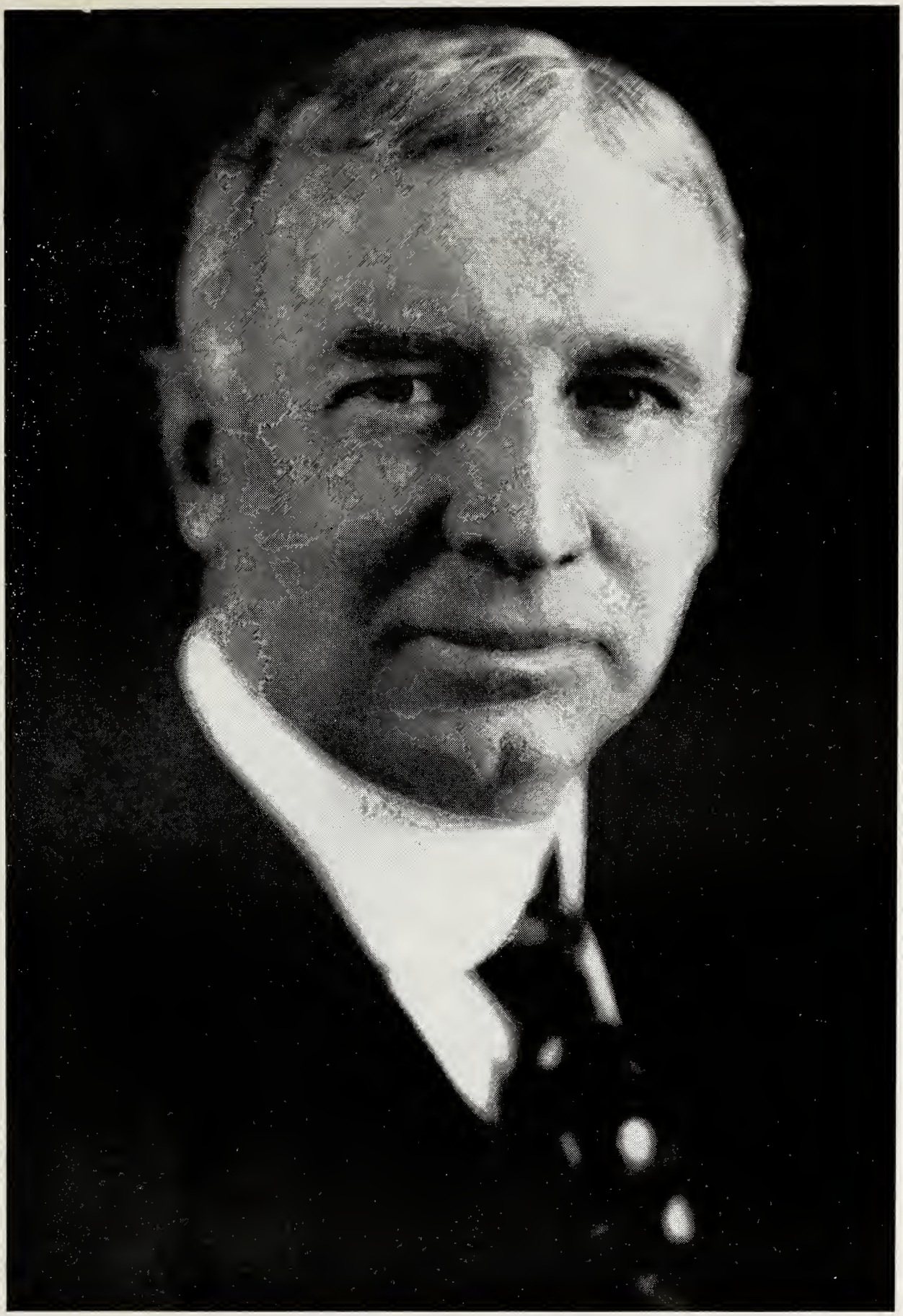
INCIDENTS BY THE WAY

LIFETIME RECOLLECTIONS AND REFLECTIONS

WM. R. KENAN, JR.

1946



William R. Kenan, Jr.

Done at intervals
1940-45
And privately printed, 1946

To my sister
Sarah Graham Kenan
with best wishes
Wm R Kenan Jr

Incidents by the Way

Lifetime Recollections and Reflections

Wm. R. Kenan, Jr.

PROLOGUE:

Affection for my immediate family and for the younger generation of the Kenan Family has induced me to record on the following pages recollections of my active life, which has been varied and to me most interesting. It is an experience that few men live to enjoy. I have worked hard, but enjoyed it all. In fact, should I have my life to go over again, I would not wish it to be changed one iota.

"The tree is known by its fruits and the noble family by a noble man."

Dedicated to my wife

ALICE POMROY KENAN

The Boy! What has the future in store for him?

What will be his experience? And how will he handle it?

FOREWORD

Ambition is a stimulating little quality that prompts one to want anything they haven't so far been able to possess.

No one perhaps ever reaches his goal, but that is not failure. Real success comes with the steady pursuit of what you are trying to accomplish.

The Kenan name is found in the Holy Bible. The first Book of the Chronicles, Chapter I, Verse 2. Also Genesis, Chapter XV, Verse 19. Kenites descendants of Kenan.

CHAPTER I

THE KENAN FAMILY

The Kenan family came from Scotland to Ireland in 1700.

Thomas Kenan married Elizabeth Johnston and came from Port O'Ferry,—in the Northern Part of Ireland, about the year 1730-1731 to Wilmington, North Carolina.

Thomas and Elizabeth Kenan had four sons and four daughters,—James Kenan being one of them born September 23, 1740, and died May 23, 1810.

James Kenan played an important part in the Early history of North Carolina. He was a member of the Committee of Safety for the Wilmington District in 1775; member of the Provincial Congress at Halifax, North Carolina, in 1778; Colonel of the Militia of Duplin County during the Revolutionary War; Brigadier General of Militia after the War,—and for many years a member of the State Senate.

James Kenan married Sally Love and they had three sons and five daughters.

One of the sons was Thomas Kenan.

Thomas Kenan married Mary Rand, of Raleigh, North Carolina. They had six sons and four daughters.

One of the sons was Owen R. Kenan.

Owen R. Kenan married Sarah Rebecca Graham, daughter of Stephen and Ann Graham, on May 12, 1836. They had three sons and one daughter, among whom was William R. Kenan, who married Mary Hargrave, daughter of Jesse and Margaret Hargrave on March 25th, 1864, of Chapel Hill, North Carolina. They had three daughters and one son:

Named	*Married*	*From*
Mary Lily	Henry M. Flagler	Florida
Jessie Hargrave	Clisby Wise	Georgia
Sarah Graham	Graham Kenan (a first cousin)	North Carolina
William R., Jr.	Alice Pomroy	New York

William Rand Kenan, the elder, a brother of Colonel Thomas S. and James G. Kenan, was a Captain and Adjutant of the Forty-third North Carolina C.S.A. As he was in the Confederate Army in what would otherwise have been his senior year at the University of North Carolina, he could not then take his degree. But finally, in 1911, the University gave him his diploma, dating it back to 1864. He was a wholesale merchant of Wilmington, North Carolina.

William R. Kenan, born August 4, 1845, died April 14, 1903.

Mary Hargrave Kenan, born July 3, 1842, died June 6, 1916.

Mary Lily Kenan, born June 14, 1867, died July 27, 1917.

The others are still living.

110 Nun Street

CHAPTER II

EARLY RECOLLECTIONS

I was born on April 30, 1872, at Wilmington, North Carolina, in my father's house at 110 Nun Street. The house was frame construction, about ten feet from the street line, with a yard on one side and a driveway on the other; a fairly large grounds in the rear. The house was two story and attic with a veranda in front, one across the west side and a two story veranda at the rear. The storeroom and kitchen was a separate building (the storeroom was just as large as the kitchen) separated from the main house about twelve feet and had a veranda connecting about ten feet wide across the front. There was no cellar under the house, it being constructed on brick piers about four feet high,—enclosure being lattice work.

The heating was by means of a fire-place in each room, and, in addition, a pot stove in the rear hall, first floor was used. In later years a cellar was dug under the rear veranda about 10 x 16′ and a hot-air furnace was installed for heating, coal being the fuel.

The house faced north, had high ceilings, large windows and was painted white with green blinds. There was only one bath room and it contained a copper tub built in with wood. This opened into my parents room and also had a door opening on the upstairs rear veranda. A hall went through from the entrance to the veranda on the rear. On the left or east side was a large room which was designated "the parlor" and a smaller room to the rear used as a play room, with entrance from the rear veranda. On the right or west side was the living room and back of that the dining room and then the butler's pantry, which opened on the rear porch.

A barn at the end of the driveway and in the corner of the property was used as a wood house and each fall it was completely filled with Black Jack, a small sized Oak tree which

was used both in the kitchen range and also in the numerous fire places.

When I reached about eight years old my job was to keep the wood boxes on the rear verandas (both first and second floors) filled. After a few years of carrying wood upstairs, I rigged up a hoist and purchased a goat and had him haul up all the wood, which was great fun.

Our family was Scotch Presbyterian so we all went to church and Sunday School every time the bell rang. My father was a Deacon, then an Elder and Treasurer up to the time of his death. He was a strong active man and each morning and evening would go through a setting-up exercise using Dumb-bells or Indian Clubs. He took great pride in his physical condition and yet he died in 1903 at the age of 58 years at Johns Hopkins Hospital, Baltimore, Maryland, of Amoebic dysentery.

Sunday was a day of rest and after going to Sunday School and church we spent the rest of the day quietly at home. We always had ice-cream for dinner Sunday and I was very fond of it. I would fill up until I could not eat any more, then go out and run around the yard for a while, then come back and eat more. My younger sister Sarah always joined me in this procedure.

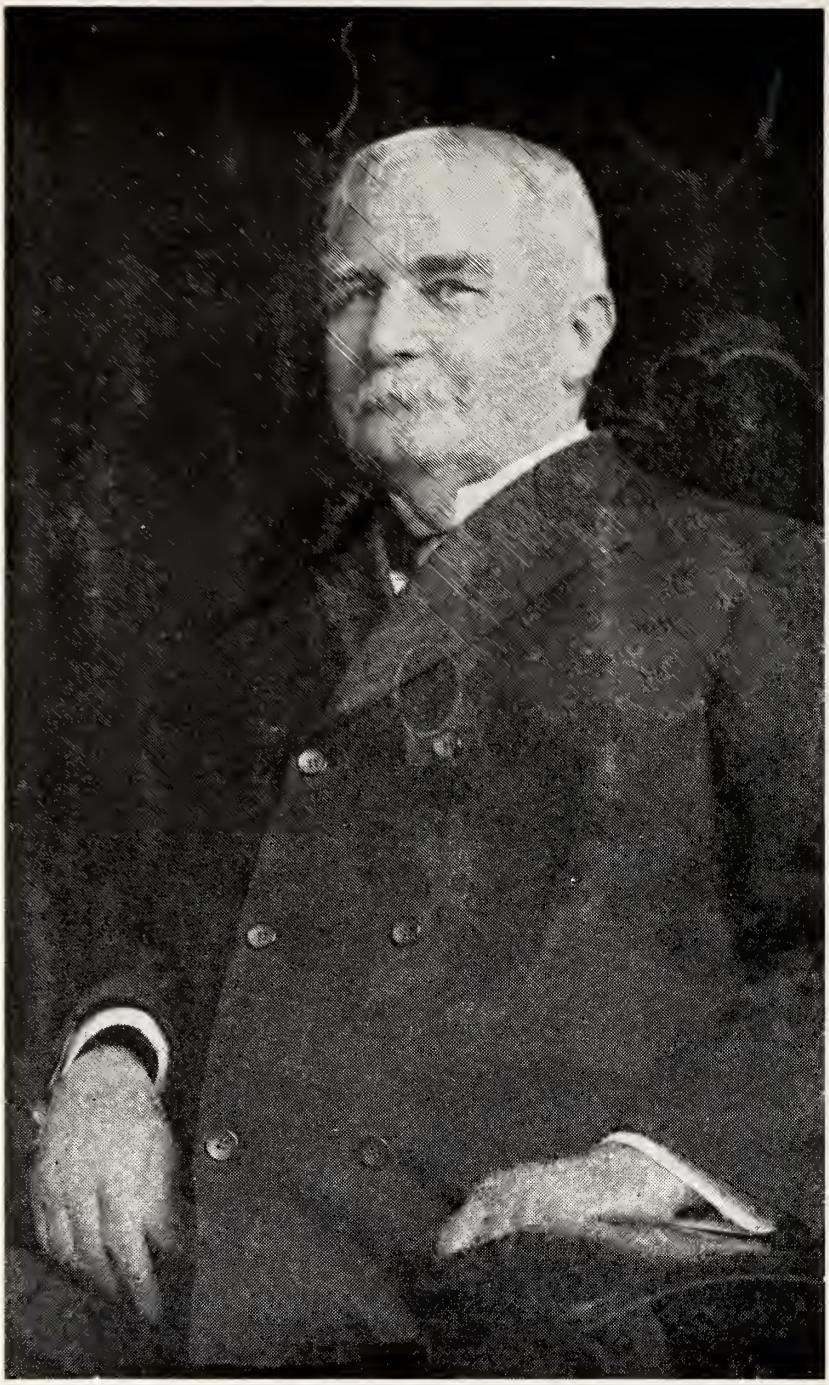
I raised chickens for many years, mostly for food purposes, but I did raise some very good Game birds and was most successful in our many Cock Fights.

My mother was a good housekeeper and a fine seamstress. When we were young she would get in a colored seamstress and, together, they would make most of our clothes, including my clothes, until I was about eight years old. She was small of stature but the most energetic person I ever knew. She was always occupied. She was fond of music and any night a crowd of young people would call and she would play the piano all the evening for us to dance. This was very frequently done. She lived to be 74 years old and died of a heart ailment which she suffered for several years. In her latter years she got great en-

My Mother

joyment in driving about the country in a one-horse surrey with a coachman. She loved people and had many friends who called frequently at her home after she was incapacitated. She would make friends of anybody.

I was always interested in construction and from time to time received many carpenter tools. I built several shacks in the yard, improving and enlarging them from time to time. I also built a model of a boat and fully rigged it. Also a canoe and used to carry it back and forth to the river, where we got



My Father

much pleasure in going all about. We were only a block and a half from the river.

My eldest sister was approximately five years my senior and when she came out, or made her debut, it was the usual custom for the young men to serenade the young ladies at night with vocal and instrumental music, especially if some other out of town young ladies were visiting at our house.

My room was at the end of the hall, second floor, directly over the entrance, had two large windows and was a corner

room. It was very favorable to see and hear the serenade, so the girls would all pile into my room and, of course, wake me up, much to my disgust.

I was interested in a foreign stamp collection and it was our custom to board foreign ships both at the docks and out in the stream to obtain stamps from the members of the crew. I had a very fine collection of about 1,000 varities and, when I came north to live, left them at home and they simply disappeared.

My father was a great hunter of all kinds of game and with any kind of gun. It seemed to be natural with him. He was the best shot I ever saw. When I was eight years old he gave me a gun (a 16 gauge double-barrelled shot gun) and afterwards I always accompanied him when hunting. He would take a 22 rifle and kill more squirrels than I could with a shot gun. We would hunt ducks in a canoe with a colored boy to paddle us. I sat in the bow and he amidship and I always shot first and if I missed he always knocked them down.

He was much interested in the National Guard. Organized a company in Wilmington; was it's Captain for many years, and then the Adjutant of the State Guards. He always went into Camp with them each summer and on the rifle range he would take any one's gun and outshoot the whole Regiment.

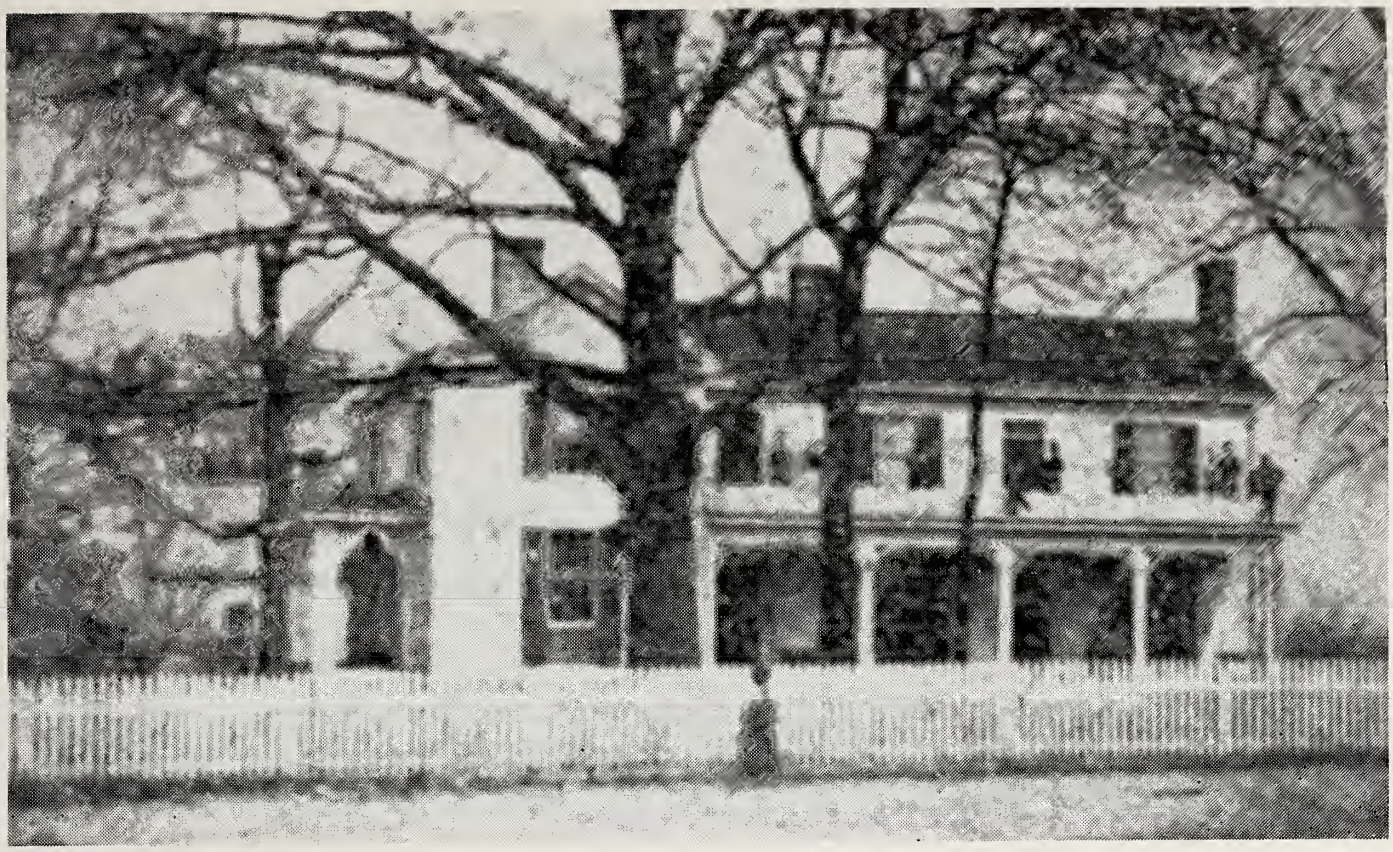
As a small boy I was much impressed with the following: There was a riot of colored men in Wilmington and my father organized a volunteer company of men with all kinds of rifles together with a riot gun on a wagon and they cleaned up the riot very quickly, although they were compelled to kill several persons. He rode the wagon and directed the operation.

When I was about twelve years old my father purchased a pony for me, a real wild Mustang, never had a bridle nor a saddle on him. They were driven from the range, loaded in cattle cars and brought to Wilmington to be sold. The cowboys would lasso the horse, one around the neck and then the other around the hind leg and throw the horse to the ground,

W. R. Kenan, Jr.
as a baby

when saddle and bridle was attached and we boys learned to ride by mounting the horse on the ground. It was great fun. We did not learn any particular gaits but we could stick on any horse.

There was a period when we boys all rode mules and the only fall I ever experienced was when riding a large mule. We were on a sandy road and going pretty fast, the mule stumbled and went down. I simply was projected through the



Hargrave Home, Chapel Hill, 1860

air and landed in the middle of the road about thirty feet ahead of the mule. We both got on our feet and I mounted the mule and proceeded as though nothing had happened. Fortunately, the road was sandy and I was not injured, except a strained shoulder.

I also was given a high front wheel bicycle with pneumatic rubber tires, which I enjoyed for many years.

My mother was born and raised at Chapel Hill, N. C. attended the public schools and finished at the Oxford Female Seminary, at Oxford, N. C. My maternal grandfather was a farmer but lived in Chapel Hill. His farm was a few miles east of Chapel Hill.

One fall, while at Kenansville, they were killing the hogs for the winter supply. It was not unusual for my grandfather to kill 35 to 40 at a time as he had his own smoke house. This had a hearth in the center of the building and ventilators towards the roof in the side walls,—to give a draft and keep the smoke continuous. They always used hickory fuel only,

believing that it produced the best flavored meat. They were making sausages and I was looking at the grinder, as I did not understand how it worked, put my finger into the same and the end of one finger on my right hand came off. I had it sewed on again and it did not give me any trouble thereafter except when playing baseball on two occasions I got it partly split off.

My Paternal Grandfather looked upon Sunday as a day of rest, so the noon-day dinner was all prepared on Saturday and, of course, a cold spread was eaten. They frequently had for dessert apple pie. The bottom or crust was made and apple sauce put in just before being served, this was covered with a deep layer of whipped cream and was it good.

It was our custom to go up to Kenansville, N. C., the home of my Grandfather, each Christmas and many holidays. We took the train up to Magnolia, forty-eight miles and drove in a buggy or other conveyance out to Kenansville. It was eight miles via a sandy road and usually took one hour.

Liberty Hall, Kenansville, 1890

CHAPTER III

KENANSVILLE, NORTH CAROLINA

Reprint from "The State", Vol. IX, No. 28, Dec. 13, 1941

"KENANSVILLE is the oldest town in the county. It wasn't the original settlement, however. The first place where the early citizens built a little community was at Serecta, some seven miles distant from Kenansville. And although Kenansville is now the county seat of Duplin, it didn't always enjoy this distinction.

The first courts were held at Miller's Bridge in William McRee's house. That was in the extreme eastern part of the county and, when you take into consideration the fact that Sampson was part of Duplin in that period, you can readily see that the location was somewhat inconvenient. So after four or five years, the county seat was moved to a place near Baltic Station, not far from Warsaw. When Sampson County seceded, it was decided to move Duplin's county seat further east, and that's when Kenansville was selected. The present structure is the third courthouse that has stood there. Kenansville was first known as The Grove. It received this name from the old Grove meeting house which stood near Routledge Cemetery, a short distance outside the town limits. The church was later moved to another location and finally to the spot where it now stands. For a brief period it also went under the name of Duplin Courthouse.

Grove Church, so far as is known is the oldest Presbyterian Church in North Carolina. It was established about 1736. Hugh McAden, preacher of note and founder of churches, worked all through that section of the state and at one time lived near Kenansville. He later moved to Caswell County, where he was buried in 1781.

And, speaking of churches, here's another interesting thing:

There are three churches in Kenansville — Presbyterian,

Methodist and Baptist. All three of them were built before the War between the States. We doubt whether you will find that in any other town in the state.

The Kenans were outstanding citizens of Duplin County. The original member of that family to come to Duplin was Col. James Kenan, who was in charge of the American forces when they were defeated at the battle of Rockfish (in the lower part of Duplin) by the British under command of Major Craig. Colonel Kenan was appointed Brigadier General for the Wilmington District of State Militia after the Revolution. He was sheriff when only 22 years of age and held other political offices. His son, Thomas, represented Duplin in the State Senate in 1804 and from 1805 to 1811 was a member of Congress. He removed to Alabama and was also prominent politically in that state.

Liberty Hall, built by Major Owen R. Kenan in the 1840's, is still standing in Kenansville and is a lovely old place. The Major was a militia officer and a member of the Confederate Congress. It was here that the most lavish social event ever held in Duplin County took place. The Major's granddaughter, Miss Mary Lily Kenan, was married in Liberty Hall to Henry M. Flagler in 1901. And it was Flagler, as you may recall, who, with John D. Rockefeller, founded the Standard Oil Company. Well known people from all parts of the country attended the wedding.

William R. Kenan, grandson of Major Owen and brother to Miss Mary Lily, is well known in banking and business circles throughout the country. He makes his home in New York City and it is he who presented Kenan Stadium to The University of North Carolina.

The old Grove Academy was established at Kenansville during the year 1785, prior to the establishment of our State University. It was usually conducted by the church pastor in connection with his pastoral duties. It had numerous strong and able men for president and teachers, and many of those who

Martha
the cook

attended it became conspicuous in the affairs of the county, state and nation.

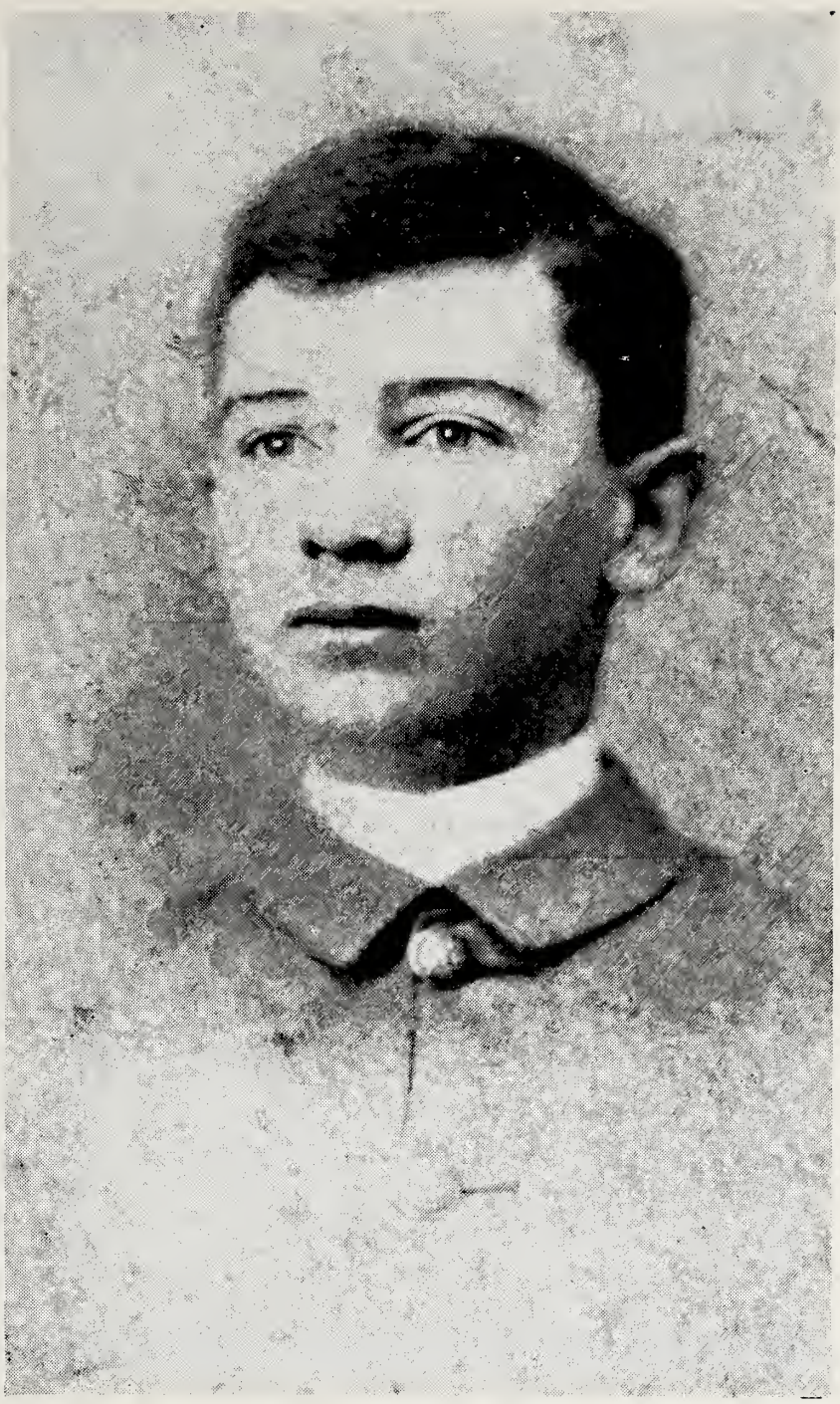
And another place of interest in the immediate vicinity of Kenansville is the site where the Confederate Sword Factory stood. Swords were manufactured here on a large scale by J. H. N. Cornehlson and were shipped not only to North Carolina but to troops in other parts of the South."

Usually all the grandchildren would be there and did we have fun. Negro servants, many of all ages,—Martha, the cook, had a large family, all of them living on the place, and, in addition there were several other families living there. She was raised in the kitchen, her mother being the cook for my grandparents. She had two brothers, Lewis and James. After my grandparents death, Martha stayed with a maiden daughter Annie (my Aunt) at the old homestead; Lewis went with my Uncle Thomas, in Raleigh, and James came with us in Wilmington. All three were born cooks. James would make a cake, put it in the stove and go down town but always returned in time to take it out in perfect condition.

My two sisters Jessie and Sarah, each with separate houses in Wilmington, N. C. have some of their servants from the Old Homestead at Kenansville at this date. They are efficient, energetic, and above all, most loyal and trustworthy.

At Liberty Hall every one was welcome and we children could do anything. There was a large high ceiling cellar under part of the house. Most unusual for the south in those days. This was the wine cellar. It contained many large wooden casks containing both hard liquor and many kinds of wine, all made on the place. The key of the cellar hung on the wall of the Butler's Pantry. It was about eight inches long and weighed approximately one pound. We children would take it any time and sample every cask in the cellar. There was no way to get the contents out, except through the bung hole in the top side so it was necessary to take a rubber tube and siphon it out, which we did.

The bed-rooms were large, many having four-posters and deep feather mattresses. The heating was done by means of wood in fire places, one in each room of the house. There was no refrigeration of any kind. If a chicken was required for dinner, it was killed and cooked immediately. If we had beef or lamb, it was planned ahead when to kill it and the excess over our consumption was sold to the neighbors.



W. R. Kenan, Jr.
18 years old

On Christmas we always had a barbecue of both pig and lamb. This was done out of doors by digging a trench 2′ wide 15″ deep and 6′ long the fire in the bottom and hickory limbs were laid across the pit above the fire to carry the carcass. To get the most delicious flavor barbecue it should be cooked twelve hours over charcoal made of hickory wood. The carcass is laid flesh down the cooking is done rapidly at first in

order to brown the meat and hold the juices inside; after that the heat is reduced and the roasting is done slowly. The carcass is turned frequently and basted all the time with a sauce very highly seasoned.

I enjoyed cutting wood, hauling it from the forest etc. for which I was regularly paid.

My Grandfather frequently gave me a calf which I would raise on his feed and, when grown, I would sell it, keeping the proceeds.

Sometimes when we came up to spend the summer I would plant a garden and work it but as I had to return home in time for school some of the vegetables were not matured; however, I was sure to harvest them and take them home.

The houses that you remembered as big and beautiful have dwindled and become commonplace.

CHAPTER IV

MORE RECOLLECTIONS

We spent several summers at Wrightsville Beach and I was in the water most of the time either swimming, boating or fishing. However, our family doctor (George Thomas) thought it better that we spend the summer in the mountains. This we did, either at Hendersonville, Asheville and, later, at Blowing Rock.

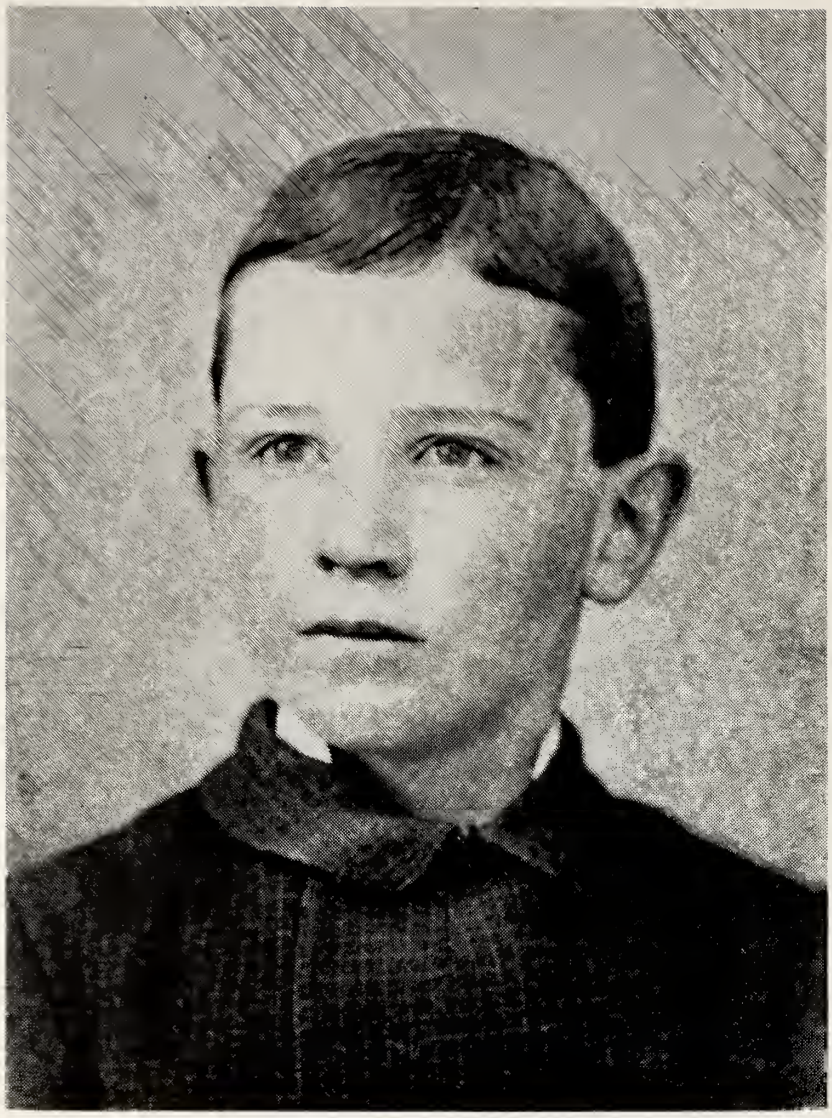
It was a difficult trip by train to the mountains. We left Wilmington in the middle of the afternoon, went to Columbia, S. C. and about midnight had to change cars to get to the mountains, arriving the following morning. We always took "Nicey" our colored nurse, who was strictly a member of the family and really raised all four children.

I remember one night at Columbia I was carrying a tin foot tub packed with many hats when I stumped my toe and fell. Everything in the tub flew out and scattered. My nurse was disgusted beyond words.

We would tramp all through the woods in the mountain to get chestnuts and chinkapins, and they were plentiful in those days. We also saw many wild turkeys.

My father loved good food and always had plenty of the best in the market. He always did the marketing each morning when he went to his office. He would purchase the most unusual things and we all enjoyed them. He also liked people and we had some one to meals almost every day.

In the summer, when the family was away, he would have several young men to dinner etc. very often. He was very fond of young men and a great many used to hang out at our house. There was always wine and hard liquors on the sideboard and I and my associates were welcome to it at any time. He liked a long toddy and frequently had one to which I was always invited. He smoked nearly all the time, cigars and sometimes a



W. R. Kenan, Jr.
8 years old

pipe. He gave up smoking entirely several years before his death. He always said to me: "If you wish to smoke, smoke in the house, it is not necessary to get in the barn when doing it."

During the summer of 1886 (I was fourteen years old) we experienced the Charlestown earthquake. I was spending some time at Greenville Sound, a short distance from Wilmington with a cousin of my Mother's, Mrs. McCrary, known to me as "Cousin Patty". Her sister, Miss Roe Wiggins, was also there. It seems that I slept through the whole performance. They were terribly excited as the china tumbled from the shelves and some damage was done. When they waked me up, I was much disappointed not to have experienced it, and asked if it could not be repeated for my benefit. That was just the wrong thing to say and my hostess was disgusted.

CHAPTER V

SCHOOL DAYS

I started school at Mrs. Price's, a private school for both boys and girls, located on the corner of Fifth and Orange streets. Then I attended the Tileston High School, for several years, on Ann Street, between 4th and 5th streets. Afterward I went to Professor Catlett's Boy's School on Fourth street, just north of Princess street. Next I attended Horner's Military School, at Oxford, N. C., 1887, 1888, 1889, having three years of military training. I was just fifteen years old. The school had been suggested to my parents by the Williams family (good friends of theirs) one of the Williams girls having married Jerome Horner several years before. He, together with his father, J. H. Horner, and his younger brother, Junius M. Horner, owned and operated the school. It was located on a high hill just outside of Oxford, North Carolina. This was a splendid location with large private grounds and extensive drill campus. The main building was a large dwelling house in a grove, which had been added to in order to provide a large dining room, kitchen, etc. on the second floor and several class rooms on the ground floor.

The Barracks was an "L" shaped building of two stories located about 100 feet from the main building, with a veranda the entire length, both first and second floors. All doors opened on this veranda. A retired Army Officer was Drillmaster (Colonel T. J. Drewey) and he also taught Military Tactics. The elder Horner was of the old school and required all kinds of Greek and Latin. I took both for three years and never knew anything about either. The school was run strictly on a Military basis and was very beneficial from a physical point of view. We had to drill every day but Sunday one and a half hours, do guard duty twice each week for two hours each, and we had spare time for athletics. I served as corporal, first lieutenant and adjutant also captain of first company.

CHAPTER VI

COLLEGE DAYS

I entered the University of North Carolina in the fall of 1890 taking a four years scientific course, graduating June 1894 and receiving a B.S. degree.

Assisted in the Chemical Laboratory 1893 and 1894.

The summers of '92 and '93 spent in research work on Calcium Carbide. This work was under the direction of Dr. F. P. Venable, Professor of General and Analytical Chemistry. We discovered Carbide, determined it's formula and made known the fact that Acetylene Gas could be evolved from it.

(See my History of the Discovery of Calcium Carbide in the United States under addenda, memorabilia, etc.)

When I entered college there were no electric lights nor any toilet or bathing facilities. Every one used kerosene and the majority of students used student lamps of the single or double type. There was a fire place in each room of the dormitories. Wood was the fuel used and each student had to provide such fuel as was necessary. Should you desire a bath the following procedure took place:

Build a wood fire in the fire place and heat the necessary water in a kettle placed on the fire,—the bathing was done in a large foot tub. Colored porters provided the fuel, cut it to proper length and placed it in the rooms at a price. There was considerable competition in this business and various quality in the fuel.

The first three years in college I roomed in the South Building which was a dormitory at that time on the third floor north side next to the west corner room. Owen Kenan was my room-mate and Alexander and William Andrews had the corner room.

During my senior year I moved down in the village on the

Main Street at the east edge of the town. Charles Baskerville was my room-mate. He had graduated from Vanderbilt University and was taking a post-graduate course in chemistry. This arrangement was most satisfactory and pleasant. Dr. Baskerville became the head of the Chemistry Department at the University of the City of New York and died several years ago in that position.

My four years in college at Chapel Hill were the most enjoyable of any. I did not have a care. Was allowed to get away with most anything. I studied fairly well during my Freshman Year, although I did have some trouble with French. I had no liking for modern languages and, as my course required two years of modern languages, I put it off and took German during my senior year. During my Sophomore Year I attempted to take a two-year course in one, which accounts for my being recorded as a member of the Class of '93 instead of '94. Before the year was over I developed muscular trouble with my eyes, so gave up the effort and dropped back to '94, the class I entered with.

I attempted every kind of student activity and was fairly good at many of them. I could not sing nor play any instrument, therefore, could not qualify for the Glee Club, so I conceived the idea of using the intermission between the two parts, by having a tumbling act. Therefore, I consulted Professor Carl P. Harrington, the Director, whose first reaction was it would be foolish, but I eventually persuaded him to look us over. He agreed to come over to the gymnasium and view the performance. We put it on for him and, after that, I became a member of the Glee Club. My associate was Dr. Charles S. Mangum, who was already in the Glee Club, as he had a wonderful tenor voice. I am sure that this is the only occasion known where a tumbling act was put on in connection with a Glee Club concert!

The above happened in 1891. Further, we also were asked to join the University Minstrels, performing an act as the "Jolly Tumblers".

University of North Carolina Baseball Team, 1892

Front row *(left to right)*: Floyd, J., and Oldham. Second row *(left to right)*: Robertson, Jones, Wood, Hoke, Kenan and Hendren. Standing *(left to right)*: Lanier, Ashe, Mgr.; Johnston, and Moyer. (Absent, Floyd, W.)

I was elected to Sigma Epsilon Fraternity during my Sophomore year and that same year was elected Sub-Ball Manager for all of the Commencement Dances. Was also on the Board of Editors of the Year Book (Known as the Hellenian those days).

I was elected Chief Ball Manager during my Junior year also to the Order of the Gimghouls, (a junior society) was leader of the German Club during '91, '92 and '93.

I did not go out for athletics during my Freshman year, although I did constantly work in the gymnasium and played considerable tennis until I was a fair player.

It was during my Sophomore year ('92) that I went out for baseball and made the team, playing Right Field that season, while during 1893 and 1894 I played Right Field and Change Pitcher. I was also manager of the Base Ball Team all three years. In 1894 was elected Secretary and Treasurer of the Senior Class.

I did not go out for Foot Ball since I was considered too light, weighing only 142 pounds. However, I did make a try in 1893 and won a place on the team after two days of practice, playing Right Halfback. This was my Senior year. I was fast and quick, which helped greatly. In those days The "Flying Wedge" was the play,—and was it rough! There were no forward or lateral passes, one had to carry the ball.

I was graduated with an average standing. Could have done better in my studies but I wanted to take part in all phases of college activities. The greatest thing a young man learns in college he absorbs without knowing it. Education is not a static thing. It is not a culture which a man puts on as he would a suit of clothes. It is a dynamic thing. Education should concern itself with the whole personality, not the brain alone. I honestly believe one gets a great deal out of college besides book knowledge and I am sure that it is most beneficial to try athletics. As a matter of fact, I do not believe I could have

withstood the physical grief of my career, were it not for the resistance built up by my years of athletics. I also believe one should try for all kinds of college activities. Probably we all forget the greater part of what we have learned in college but the things that we can't lose are the influences upon character that go with us to our dying day. If I had my college career to go over again I would not wish to change it one bit.

I had a grand time in college and especially from a social side. Made many staunch friends, both in the student body as well among the faculty. I was extremely fond of dancing and always welcomed a chance to attend at any place far or near. This desire frequently got me into trouble, having cut too many classes, when I was called up before the faculty, I simply acknowledged the coin and left to have my very good friends Dr. Venable and Professor Gore, of the faculty, to straighten the matter, which they always did. Both were fond of athletics, especially Dr. Venable, and he accompanied the teams on many trips. I always roomed with him when he was along.

1893 was called depression "Panics". Before the panic of that year there had been 1890 railroads in this country. Within the year 192 of them had gone into receivership. They represented one-fourth of the total capitalization of all the railroads in the country.

Everyone was hard up financially and the future was dark and with it all my Father suggested that I make a trip to the World's Exposition at Chicago. This I did with three of my college friends. We went to Richmond and then via the Chesapeake & Ohio R. R. to Chicago. We remained about a week had a grand time and stayed at the Palmer House. We returned via Niagara Falls and New York City, both of which we enjoyed thoroughly.

During the three years at Oxford, N. C. and the four years at Chapel Hill, I made numerous trips to Raleigh to visit my uncle and aunt, Colonel and Mrs. Thomas S. Kenan. They had no children and were always glad to have any of their nieces

George Stephens, Jesse Oldham and W. R. Kenan, Jr.
Team 1892-93-94 (1931)

or nephews to visit them at any time. They were simply wonderful to all of us, nothing was too much trouble and they never knew when we were coming or how many. If we arrived late at night, the servants would let us in, as they resided in a small house on the lot. We would fill the beds and probably as many cots and next morning by counting the hats in the front hall it was learned how many were in the house.

During my Senior year at College, Mr. Harry Walters, knowing of my interest in chemistry and electrical engineering, suggested that I join the Atlantic Coast Line. I thanked him graciously, but declined. Some months later he broached the subject again. At this time I said:

> "Mr. Walters, I can't do it, for the reason that if I proved to be a success I would not receive the credit for what I had accomplished, since everyone would say: 'The Chief is behind him and, of course, he will succeed and be pushed forward' and, if I were a failure, you would have difficulty getting rid of me."

I am still of the opinion that, as a basic proposition, one should not employ one's relatives, and, further, you should not take any liberties with your expense account, if you are not sure it is right, leave it off.

I secured a job before I had graduated and the following day went to work, making water analyses for the North Carolina Geological Survey also made a number of fertilizer analyses. I worked approximately twelve hours each day during that Summer and made several hundred dollars above my expenses. At the end of the Summer I had accepted an unsolicited position as one of the Masters at St. Albans School, Radford, Virginia. I did not fancy the position but my Father and my friends of the University of North Carolina faculty both considered it a very good experience. I went there September 1st, 1894, and taught mathematics and sciences; was captain and coach of the football team, played Left Halfback, ran the gymnasium two hours each day except Sunday, played Left Field and Change

Pitcher on the baseball team; was also leader of the German Club. I never worked so hard in my life! I had thirteen boys in my classes older than I was and sometimes they were a problem. I also took a correspondence course in Electrical Engineering, for future use. I received $1,200.00 for nine months work, in addition to all living expenses. I was so thoroughly occupied that I could not spend any money, so, at the end of the first year out of college I had accumulated about $1,500.00.

At the beginning of my teaching the older boys started a rumpus in my class room. I protested vigorously but without results. When one day, at a class in geometry, I was trying to explain a problem by means of a drawing on the blackboard. There were several of the older boys in the front seats not paying any attention to what I was saying and were disturbing the class. I concluded it was time to put an end to such doings, so I kept on talking and, at the same time, I walked over and behind one of the larger boys at the end of the front seat, took him up bodily and really threw him out of the door. This had a grand effect. Moreover as I was elected coach of the football team and started training I would purposely let the smaller boys tackle me when carrying the ball and dodge the larger ones so they would sprawl on the ground and every one would laugh and when they would carry the ball I would tackle them by their show strings and throw them as if I was attempting to make a hole in the ground. From that time on I never had any more trouble.

I returned to North Carolina during the summer of '95 and obtained a position with the General Electric Company. Was sent to Chapel Hill to assist in installing a steam and electric plant for the University. The power house was composed of fire tube boilers of 125 pounds pressure, Hand fired. (Today we are operating at 2500 pounds pressure using mechanical stokers and consuming powdered coal or oil, or both). This

St. Albans School, Radford, Va., Football Team, 1894

being due to the development of electro metallurgy in producing high tensile steel.

The electrical equipment consisted of two General Electric multipolar direct-current machines with a voltage of 110-120 volts each. These were operated in multiple with a third or neutral wire producing a standard voltage of 110 between the neutral and the outside wire and 220 volts between the two outside wires. The former voltage was used for interior lighting and in close proximity to the plant. The 220 volts circuit was used for lighting the campus and the streets.

All the wiring in the buildings was exposed, that is, held in place by porcelain knobs fastened by means of screws. Where the wires went through a partition or wall porcelain tubes were used as insulators. I remember distinctly standing on a stepladder and driving a screwdriver in the ceiling of the dormitories until my back was broken literally.

There was in addition to the above, a storage battery set. This was charged during the early evening and as the plant shut down at midnight, the storage batteries carried the lighting load during the balance of the night. The results were entirely satisfactory and were modern and up-to-date at that time. This detail required the summer and fall of 1895. My salary was $80.00 per month and no expense account except when moving from one location to another.

I was appointed instructor in the Chemical Laboratory and also started a post graduate course, applying for a Master's Degree. I never completed this work since I left to join the Carbide Manufacturing Company at Niagara Falls, N. Y. on January 1st, 1896.

CHAPTER VII

MY CONNECTION WITH THE MANUFACTURE OF CARBIDE

I assisted in the erection of the buildings and installation of the equipment; was made Chemical Superintendent. The now very interesting letter offering me the position follows:

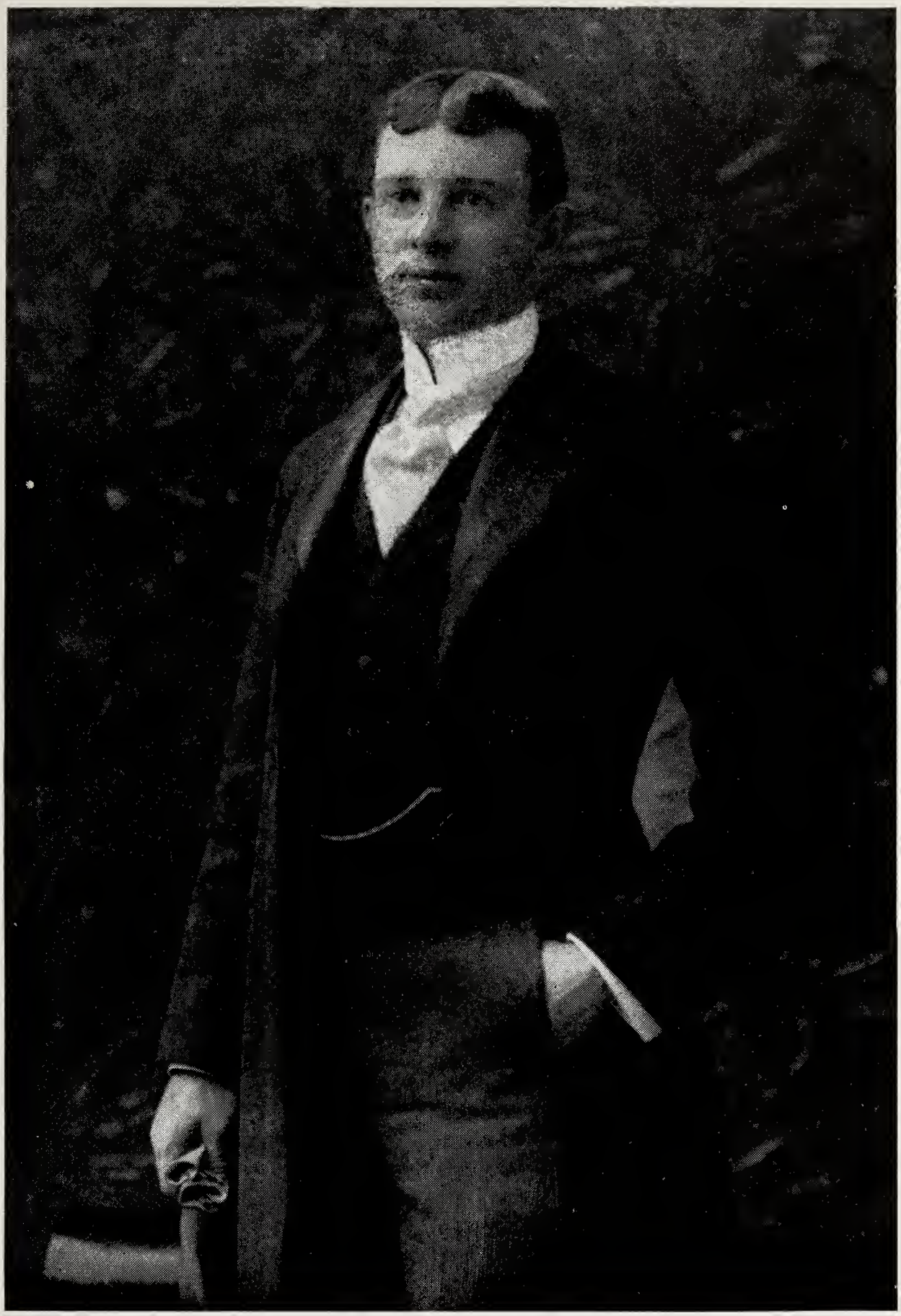
Philadelphia Dec 4 1895

"Mr. William R Kenan Jr
Chapel Hill, N. C.
Dear Sir:

We will have occasion about the 1st of January next to acquire the services of a man to do our Chemical and Clerical work and to take charge of one shift of our plant for the manufacture of Calcium Carbide now being installed at Niagara Falls. You have been recommended to us by Mr. J. M. Morehead and we write to ascertain if you are in a position to accept such a position as we have to offer to let you know what will be expected and to make you an offer of the situation.

In the event of your forming a connection with our Company you will have entire charge of the Laboratory and of the Office at all times.

We will expect you to work ten hours a day seven days a week. During six hours of this time you will have charge of the plant and of all men at work at such time. During the rest of the ten hours we will expect you to make tests of the Carbide from each charge of the furnace and to make an occasional determination of the Lime in the furnace mixtures. There will also be submitted to you for analysis samples of lime and of coke. We will expect you also to keep the time of the other men, to make out the payrolls and to attend to the correspondence and the shipments of carbide and the receipts of lime and coke. The electrical apparatus will be delivered at Niagara Falls about the 26th of December. If you decide to accept



W. R. Kenan, Jr. at Niagara Falls, 1896

the situation we will want you to report for work at Niagara Falls on Wednesday the 1st of January and assist in the erection and installation of the electrical equipment and of the wiring of the building for lights etc. under the supervision of the Engineer of the Company.

You probably will be associated with Mr. Jesse C. King, of North Carolina and Mr. Edgar F. Price, formerly of that state, now of Newark, N. J. who will have charge of the mechanical and the electrical equipment respectively and of the other two watches. We will pay you twenty-five dollars per week.

Kindly advise me care Carbide Manufacturing Company, Bullit Building, Philadelphia, Penn. as soon as you have arrived at some conclusion on the matter.

Very truly yours,

CARBIDE MANUFACTURING COMPANY
(Sgd) Samuel L. Kent
President."

I must have performed fairly well in connection with this difficult job because during the middle of June I was detailed to go to Australia for the purpose of developing and constructing a carbide plant. I was accompanied by W. C. Clark and E. F. Green, of San Francisco. Did considerable work on the utilization of acetylene designing generators etc.

This undertaking required nearly a year, I having spent most of the time in Sydney, New South Wales. This trip to Australia took 29 days from Niagara Falls to Sydney, stopping a day and a half in San Francisco and a day and a half in Honolulu, one day at Apia, I. S. and a day and a half in Auckland, New Zealand, and I was on the fastest steamer of the Matson Line. Today it can be done in two and a half days via plane.

During my stay in Sydney I resided at the Australian Hotel, a modern American designed building of about 600 rooms,

containing sufficient "lifts" (elevators) and the first refrigerating plant installed on the continent of Australia. It had been opened for operation about four months prior to my arrival. It was managed by a man named Moore, a native of St. Louis, Mo. It also had a typical American bar (called Pub) with a brass rail. Our office was in the Equitable Building, fourth floor, a ten story modern office building, owned by the Equitable Life Assurance Company of New York City. The Moores had two sons about 8 and 10 years old. They were fine boys and I was accustomed to play with them frequently. The greatest thrill they experienced was when I built them kites and we would fly them from the roof of the hotel. When I departed Mr. and Mrs. Moore gave me a gold coin purse containing five one-pound Australian gold pieces, approximately $25.00. The President of the Corporation I was working for,—I do not recall his name—gave me a stick pin containing a beautiful opal, the stone being native to that country.

When my work was completed I booked passage to return via Borneo, Java, Sumatra, then China and Japan, sailing from Yokohoma to Vancouver. Three days prior to my departure I received a cablegram to proceed to London for instructions. I, therefore, took the train to Melbourne and ship to Columbo. I remained a week on the Island of Ceylon, visiting Kandy and Kurunegala. Upon arrival at London, England, I received my instructions and went to Berlin, where I was several months as Constructing and Consulting Engineer German Acetylene Company located just out of Berlin, (Schoeneberg), I having returned through the Suez Canal, landed at Brindisi. Then took a train to Rome and Paris, enroute to London.

After my commission at Berlin, I returned to Niagara Falls. It is interesting to note that I had traveled around the world on business before I was twenty-six years old.

Mr. Harry Walters, a resident of Baltimore, Maryland, came to Wilmington when I was a very small boy and became a very

intimate friend of my family. He seemed to take a considerable interest in my welfare and when I entered college he gave me many Technical books (from time to time) most of them having been purchased in France, where it was his custom to spend a part of each Summer. All through my life, and up to the time of his death several years ago, he was a second Father to me and was the best counselor and friend I ever had. The benefits accruing from this association were beyond measure, and I wish to record here my appreciation and gratitude for much valuable advice and assistance he gave me in his last years.

He was the first individual outside my immediately family that I can remember and this grand association lasted up to his death.

He came to Wilmington, N. C. as General Manager of the Wilmington & Weldon Railroad, was very active in forming the Atlantic Coast Line Railroad, becoming it's Chairman. He also actively negotiated the purchase of the Louisville & Nashville Railroad by the Atlantic Coast Line and also became it's Chairman. He was a wonderful executive with natural business ability, had a remarkable legal mind, although he never took any course in law. He was the most outstanding, all around executive it has been my good fortune to know. He made many friends in his quiet unassuming way and was an outstanding success in the financial field.

At the time I was ordered to Australia and my family was notified, some member must have advised Mr. Walters who was at that time on his yacht "Narada" near Newport, R. I. He immediately wired me to call at his bankers in New York City (Hallgarten & Company) and get a communication from him. This I did and was greatly surprised to find a note wishing me success in my new undertaking and suggesting that I might need some ready cash before my return so he was instructing his bankers to give me Two hundred pounds (Approximately $1,000) I was overcome and did not know what

to do. I tried to have the bankers take it back, which they refused. So I just took it along.

While at Niagara Falls the early part of 1897 Mr. R. B. Goodman and myself developed a process to make aluminum. We used one of the furnaces at the Carbide Plant and succeeded in making a high grade article. However, when we went into the question of cost we found that our process was much more costly than the Hall process then being used by the then called Pittsburgh Reduction Company (since 1905 Aluminum Company of America) so nothing further was done. As all our friends were trying to find out what we were developing we simply replied we were manufacturing "Post Holes".

After a few months at Niagara Falls, I was sent to Chicago by the Union Carbide Company, where I worked on patent matters and investigated several electric furnaces producing carbide.

The Winter of '97 and '98 was spent at Appleton, Wisconsin, as Superintendent of the Appleton Carbide Company. Enlarged redesigned and operated these works. This was a hydro-electric plant,—verticle water wheels of low head.

During the Spring of '98 was moved to Sault Ste Marie, Michigan, where, as Superintendent, I redesigned, constructed and operated works of the Lake Superior Carbide Company (Both of the above works were branches of the Union Carbide Company, an offspring of the Electro Gas Company).

I constructed a power station, transmission line, etc. (as per attached description of electrical equipment below) also did much experimental work. I was Superintendent of these works until July, 1899, when I moved to Niagara Falls in capacity of Chemical Engineer, assisting in designing and constructing and operating 25,000 H.P. works of the Union Carbide Company.

W. R. Kenan, Jr. at Sault Ste Marie, 1898

A CONCISE DESCRIPTION OF THE ELECTRICAL APPARATUS EMPLOYED AT SAULT STE. MARIE WORKS OF THE UNION CARBIDE COMPANY

By William R. Kenan, Jr., *Superintendent*
(1898-1899)

The generating station is located on the Canadian side of the St. Mary's River in the Power House of the Lake Superior Power Company.

Mechanical power is leased from the above-named company, it being developed by means of water.

The station consists of one Fort Wayne 400 K.W. 2200 volt composite wound alternator 133 cycle, 467 R.P.M.

From the above one would readily see that this is a standard type lighting machine. After experiencing much trouble, due to the field grounding, the writer cut off the Rectifier and used both the high and low tension field windings in series for the exciting current. No more trouble was experienced after the high voltage was taken off of the field windings.

Three alternators of 250 K.W. capacity and 125 cycle at 700 R.P.M. were constructed by this company, on the spot, after the designs of one of our engineers, Mr. W. S. Horry. They are distinctly a Ferranti type except that there are two generators combined, each having an overhanging armature. That is, an armature is on each end of the shaft, the driving pulley being in the center. Each armature generates a potential of 1100 volts and since they are connected in series, a 2200 volt pressure is maintained. Each alternator requires an exciting current of 65 amperes at 110 volts, and all three are excited by means of a shunt wound Edison Bipolar. The transmission line is about 10,000 feet in length and consists of eight separate conductors, each being a 2/0 bare stranded cable of 19 wires. Six of the conductors are used in connection with the three Horry alterna-

tors, the same being operated in parallel. The remaining two are utilized in connection with the Fort Wayne. This arrangement was necessary because of the fact that we gradually increased our Carbide Plant from 250 H.P. to 1,000 H.P.

From actual tests made by the writer the drop in the line was found to be 19.4%, while the loss was 10.8%. That is when delivering 1,000 horsepower on the six conductors. The transmission line fed into four Westinghouse oil cool static transformers of 250 K.W. each. Three of these were connected in parallel to take care of the 750 K.W. delivered by the three Horry alternators. The ratio of these transformers is 20 to 1. Five Rotary Furnaces of 250 H.P. capacity each, were connected in parallel with the three transformers, four being operated at all times.

The single transformer fed two furnaces, these being in parallel. Generally only one is operated, but when experimenting both are run with a load of 125 K.W. each.

In order to obtain the proper voltage in the furnaces it was necessary to maintain a difference of potential of 2300 volts at the generator end of the line.

The plant is by no means an ideal one, for the reason that it was constructed in stages. However, the results obtained are most satisfactory and have not, to this day, been improved upon. No contract was let for any complete part of the electrical equipment, except in the case of the transformers and the Wood Alternator, both of which we installed. In every case the material was purchased and constructed in accordance with our own design.

I had spent more than a year at Sault Ste. Marie and had worked hard during that time, having experienced many setbacks and much ill-luck. I had made regular reports to the Chicago Office; had written in detail of my many troubles with suggestions as to how I expected to overcome them, but I got very few replies and no instructions. I was much dis-

couraged, spending a lot of money, which the Chicago office always furnished me, but not knowing whether they were in accord with what I was doing. During the early Summer Mr. George O. Knapp, Mr. C. K. G. Billings and Mr. Adams came up to the plant, spent several days and thoroughly inspected everything. Much to my surprise, Mr. Knapp called me into my office where he was sitting at my desk, pulled out his personal checkbook, drew a check for $3,000.00 payable to me and handed it over, saying: "We did not pay much attention to your operations here during the past year, but after inspecting the plant, I feel your salary should be supplemented by this amount."

I never accepted any funds from my family or any gifts from individuals from the day I graduated until sixteen years thereafter, when I inherited from my Mother's Estate,—except on two occasions which have been detailed previously.

During the Winter of 1900 I spent most of my time on the train between Chicago-Niagara Falls and New York City, making a round trip each week for the Union Carbide Company.

During the Spring of 1900 I was offered a position to go to Vienna, Austria, by the German Acetylene Company to construct and operate a carbide plant. This would have required at least a year, so I declined it, because I was tired of living in a trunk and in a foreign country, as I could not speak any foreign language. I did write an article on Calcium Carbide for these people, for which they paid me $500.00.

University Club, Niagara Falls, 1940

CHAPTER VIII

UNIVERSITY CLUB, NIAGARA FALLS, N. Y.

My stay at Niagara Falls was both pleasant and beneficial. I resided there three different periods a total of about two years.

Shortly after I arrived on January 1st, 1896, I was invited to join the University Club (February 8, 1896—No. 13) an association of college graduates for the purpose of economical living. We rented a large house, had a housekeeper and full complement of servants and usually from twelve to fifteen men roomed and boarded at the Club. It was a delightful way to live and, of course, reduced the cost considerably. The qualifications to enter were, a graduate of some recognized college and pursuing an engineering or scientific vocation.

This was the beginning of the Electro-Chemical development which brought to Niagara Falls bright and energetic young men from all over the country.

The first few months I lived at the Club I was amazed at the very full and deep discussions which took place. I simply sat and listened without saying a word. Now I am sure that I absorbed almost as much knowledge as I did at college. Further, in later years, when I required assistance in any engineering matter, I could always get the answer by writing, Lincoln, Dunlap, Edmands, Goodman, Mot Morehead, or Frank Tone.

It is interesting to note that while the Club was organized during 1895, it is still in existance, and each five years, without a miss, we have had a reunion of two days. The last one was held May 31st and June 1st of 1940, being the Forty-fifth Anniversary. Out of a total enrollment of 111 members, only 84 are living today, and of this number 66 were present at the last reunion, from all parts of the country. This is one of the most remarkable associations existing today. It is a most striking fact, that almost without one exception all these young men started without anything and by hard work and strict ap-

plication have made a great success financially as well as acquired outstanding position in the community in which they now reside. A large majority of them have retired, having made their competency.

No reunion was held during 1945 due to the war and especially transportation conditions.

CHAPTER IX

TRADERS PAPER COMPANY

June 1st, 1900, I entered the employ of the Traders Paper Company, Lockport, N. Y. as Assistant Manager in charge of construction and operation. (Also I was permitted to purchase a good block of Traders Stock). I assisted in the construction of Paper Mill No. 2; constructed a 30-ton Sulphite Mill and a 5-ton Noodle Mill; also purchased and operated the Lockport Pulp Company. Besides retaining the above positions at Lockport I was appointed (September, 1903) Consulting and Construction Engineer for the Florida East Coast Hotel Company and placed in charge of the operation of all their plants.

During 1899 and the early part of 1900, I made many trips to New York City and had the pleasure of seeing Mr. Henry M. Flagler most of these visits. He was married to my elder sister, Mary Lily, on August 24th, 1901, by Reverend Peyton H. Hoge, D.D., at Kenansville, North Carolina.

I carried out several commissions for him and during the late Summer of 1900 he advised me that he was then constructing the Breakers Hotel at Palm Beach, and while he was satisfactorily supplied with builders (McGuire & McDonald) he had no one to design the power plant, laundry, steam heating and refrigeration, and requested me to supply such a man. I knew of no one, and so informed him. At his suggestion I made a trip to Palm Beach, looked over the situation, and decided what could be done. I made a detailed report including an estimate, and when I reached New York had it typed and presented it to him. He doubted the accuracy of it, the total figures being too low. He was basing his figures on a plant that was constructed by Day & Zimmerman, of Philadelphia, for him, at the Colonial Hotel, at Nassau, B. I. There they installed the most efficient machinery and also the most expensive. Believing that an operation of approximately three months each year could not obtain the benefits from high

Mary Lily's Wedding

efficiency and moreover the operating personnel could not be of the highest ability for so short an employment I had planned to use the simplest and the cheapest appliances on the market, which would account for the difference in cost. I was unable to convince Mr. Flagler, so, to prove my figures, I undertook the job, made the drawings, contracted for the equipment and installed it, under my personal supervision. Needless to say the cost was under my original figures.

I was always of the opinion that this was a means of getting me into his organization, since he had on several occasions suggested that I come with him. I had developed my own business, which I thought a fixture and I did not wish to give it up.

The problem at Palm Beach was somewhat perplexing. The Royal Poinciana power house contained:

2 Steam-driven belted LaRoach A.C. 2200 volt 133 cycles Generators of 150 K.W. capacity each.

1 Direct-connected gasoline engine and Westinghouse Alternator 2200 volt 60 cycles of 125 K.W. capacity. This was started by means of compressed air.

The distance from the Poinciana Power House to the Breakers was approximately 1300 feet.

The question was to build a new Power Plant at the Breakers or enlarge the capacity at the Poinciana and transmit electric power to the Breakers. After taking into consideration that the Breakers required a steam plant for heating, refrigeration and laundry etc. and further there would be some loss and maintenance in a transmission line, we decided to install a complete plant at the Breakers.

This plant was composed of fire tube boilers of 150 H.P. each, with General Electric D.C. multipolar units of 150 K.W. each operating at 110-115 volts with a neutral wire with 220-230 volts across the outside wires. This made it possible to use outside lighting around the grounds at the higher voltage.

Mr. Flagler had the most remarkable memory of any person

I have ever met. He read everything, talked to everybody on any subject, and always recalled what he read or heard. Should you discuss some subject, be it engineering or scientific with him and a year or more later you related the same thing, be sure to have it the exact wording, because he surely would say: "Now let me see, on such and such occasion you told me so and so and this is different, now which is correct?"

Mary Lily
(Mrs. H. M. Flagler)

CHAPTER X

WHITEHALL, PALM BEACH, FLORIDA

For nearly three years I did engineering and construction work for Mr. Flagler without any title whatsoever. I simply purchased anything I required, made contracts for material and equipment and always signed his name to each document.

Whitehall was constructed in 1901 at Palm Beach, Florida, by Mr. Flagler, as his private residence. Carrere & Hastings who designed the Ponce de Leon Hotel, at St. Augustine, for him, were the architects. McGuire & McDonald (Mr. Flagler's builders) were the contractors.

I was a consultant in connection with the vapor heating, electric lighting, water and laundry. Portier & Stymus, of New York City, did the decorations and furnishings, under the personal direction of Mr. Pierre Stymus. A great deal of the statuary, paintings, furniture, etc. were imported from Europe.

The house was located on the lake front and a large portion of the land was filled, with a sea-wall around three sides of it.

The house was built around a court, with a very large hall across the front, being 110 feet long by 40 feet wide with 20 ft. ceiling and a ball room of the same size on the opposite side of the court. There were a large reception room, library, music room, containing a pipe organ, large dining room and also a breakfast room. There were sixteen guest rooms, each with bath, and six servants rooms with two baths. A very beautiful and expensive dwelling.

Have done a variety of work in this connection, the most prominent being The Breakers, Palm Beach, Florida; The Continental, Atlantic Beach, Florida.

Redesigned and enlarged the Power Plants at the Royal Poinciana, Palm Beach; Royal Palm, Miami, Florida; built pumping station and complete water works system at Palm Beach, designed and installed 40,000 gallon distilling plant

at Nassau, Bahama, operated a twenty-one day test with sea water and delivered 40,000 gallons average a day. It was not a success, since the cost of operation was excessive, requiring about 440 horsepower (steam). Today a new method of putting the water through a pair of granular ion-exchange synthetic resins is in use. The first bed containing cation resins, by chemical exchange of hydrogen for the metals in the water, transforms the dissolved ionized mineral salts into their corresponding acids. The second bed, containing anion resins, removes the acids. Experience has demonstrated that with a four-bed system a good potable water can be produced from brackish water ranging up to 7500 P.P.M. of dissolved salts.

During the summer and fall of 1902 I designed and constructed the Electric Light & Power plant at Miami, Florida. I transferred two belt-driven steam units of 250 H.P. each from Nassau and installed some steam turbine units also. This plant was located west of the Florida East Coast Railroad and adjacent to the River. A Water Works was also installed in this plant.

Pitcher pumps drawing from pipes driven 12 to 15 feet deep were first used in Miami. A Deep well 50 to 60 feet was drilled at the Hotel Royal Palm in 1896. This was used until a sump hole west of the railroad and north of the Miami River was installed in connection with a elevated stand tank of 250,000 gallons. A 30-year franchise was given the Hotel Company in 1900 and shortly afterwards a sump hole, located at Penniman Springs was used (the section known now as Spring Garden near the present N. W. 27th Avenue Bridge). Then in 1907, when this source became salty, the supply was moved to the grounds of the present Miami Country Club, four 8″ wells were drilled there to the depth of 85 to 90 feet and spaced about 100 feet apart.

In order to fullfil my obligation to the Traders Paper Company I organized a small staff composed of one draftsman (and sometimes two) and one (frequently two) stenographers. I dug

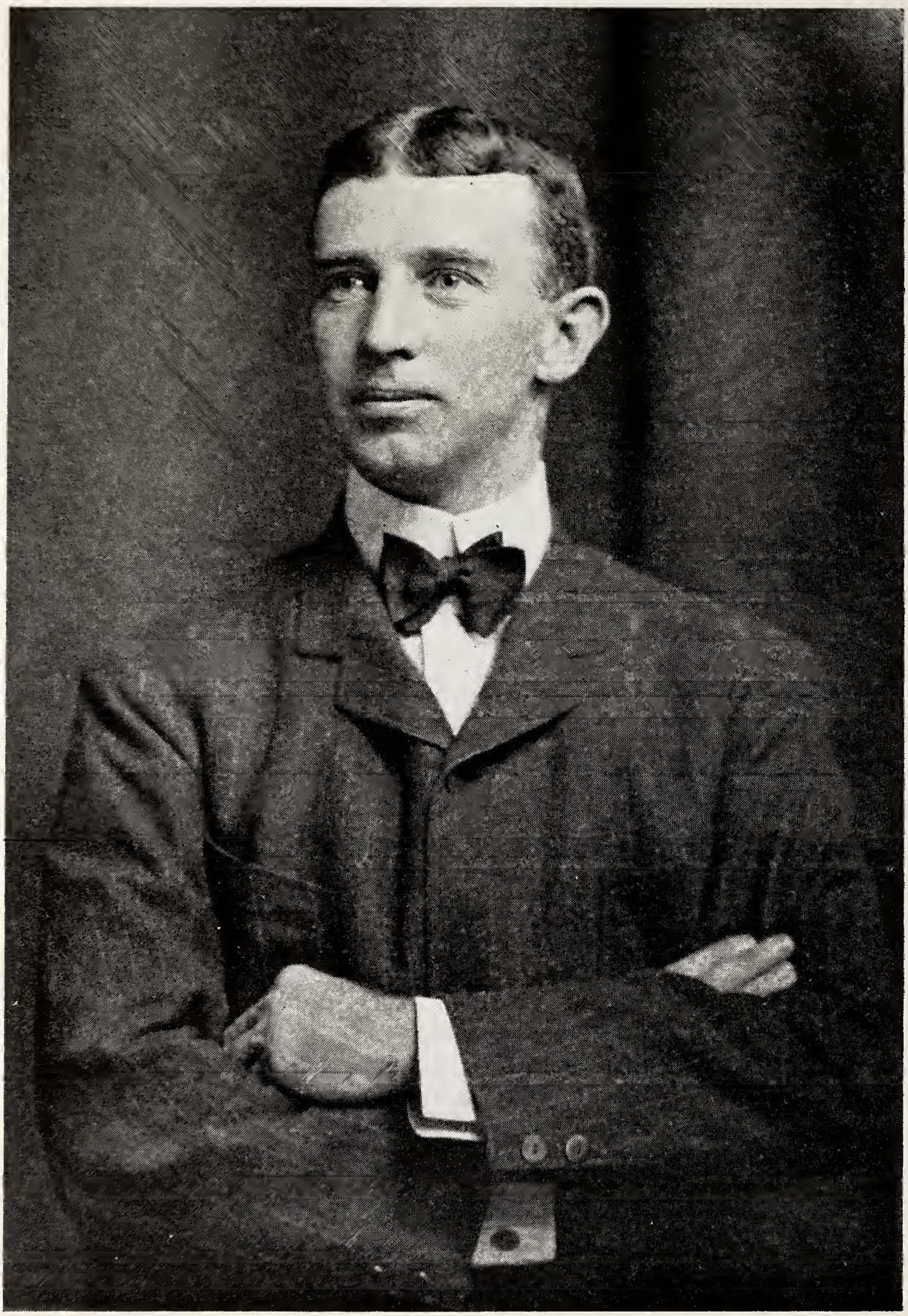
Whitehall, Palm Beach

out enough work to keep this staff busy by working between 8 P.M. and 8 A.M., in fact, I seldom retired until after midnight and was up around 5 A.M. I kept this up for more than four years.

Mr. Schuyler Beattie came with me as Secretary, September, 1900 and I am happy to say he is still acting in that capacity.

August, 1903, I was made General Manager, Traders Paper Division, United Boxboard & Paper Company, Lockport, composed of two paper mills, one sulphite mill and three ground wood mills, also Manager of the Hartland Paper Company, Division, Middleport, New York.

During the early part of 1903 the Traders Paper Company joined in a consolidation of sixty-eight other heavy paper plants to form the United Boxboard & Paper Company. I was not in sympathy with this move and so stated to my associates, so, when my stock was transferred and the new stock placed on the New York Exchange, I sold my holdings and resigned,—



W. R. Kenan, Jr., 1901

this was in January, 1904, although I still held my position about four months longer at their request.

It may be interesting to note that I was the only stockholder of the Traders Paper Company who got back their original investment.

The Breakers Hotel, at Palm Beach, having burned during the late Spring of 1903, I rebuilt the Power Plant, did the steam, water, telephone, also Ice Plant and Laundry. This work was done during the Summer and Fall, the hotel opening on December 21st.

CHAPTER XI

OPPORTUNITIES IN WHICH "I MISSED THE BOAT"

When the Union Carbide Co. was organized Mr. George O. Knapp, President, presented to all of his Engineers, myself included, 200 shares of common stock. When I resigned I returned it to him much against his will, but I could not conscientiously retain it.

During the Spring of 1900 I advised Mr. Knapp that I was going to resign, as I did not wish to go to Austria, that I was joining the Traders Paper Company of Lockport, as Assistant Manager and that I was purchasing a block of stock, which I considered an excellent investment. His reply was: "Why not purchase Carbide stock and if you are unable to pay cash for the amount you wish to purchase I will be glad to endorse your note at our bank for any amount and carry it as long as necessary."

I invested $50,000.00 in the Traders Paper Company which, had it been used to purchase Carbide stock, at the end of the first ten years, would have been worth $1,250,000.00.

During 1901 I made some experiments in using Short Leaf Pine, Long Leaf Pine or Hard Pine, in the manufacture of paper. I had a carload of each kind sent from North Carolina to Lockport (the freight charges amounted to $362.60). With these products I made Ground Wood, Sulphite Pulp and heavy papers and shipped it out as Spruce product. I spent over $6,000.00 making plans and drawing up specifications for a paper mill, employing George Freeman Rowe, of Lincoln, Maine, to do some of the drafting work and this labor alone on the drafting amounted to $2,112.50. I also purchased a site upon which to erect a mill at Wilmington, North Carolina, having connections with two railroads and also on the Cape Fear River. I estimated such an undertaking would require approximately $750,000.00, which I had arranged to finance.

Nothing further was done in connection with the project since I concluded I had too many irons in the fire already. In recent years this operation has proved most successful in the south.

During 1906 or '07 an Englishman, by name Herbert Harrison, came to Lockport representing some Philadelphia capitalist and constructed an electric furnace in one of the old Holly Mfg. buildings and operated as the Susquehanna Smelting Company. They attempted to produce Calcium Carbide, Ferro Silicon and Ferro Chrome. They did not make much progress and the corporation was purchased by the Union Carbide Company through Edgar F. Price, Vice President and General Manager. Mr. Harrison and a young man by the name of Ross entered the employ of the Union Carbide Company at Niagara Falls. After a few months Mr. Harrison returned to Lockport and started the Harrison Radiator Company. It was not long before he needed more capital, so he contacted Mr. Price who came here and looked over the operation and stated he would furnish half of the necessary capital if I would furnish the other, about $200,000.00 total was necessary. I was not looking for any investment and it looked to me that Edgar Price was planning to have me look after his investment as well as mine and he would not be required to give it any attention. I did not invest and neither did he. Mr. Harrison got W. W. Campbell, a local attorney and a friend of mine to organize a syndicate and raise the necessary funds. This was done through W. I. Keep, B. V. Covert, Eugene Ferree, Oscar Loosen, W. W. Campbell and others. The operation was most successful and after a few years they sold out to General Motors at a very handsome profit.

During the latter part of 1900 I thought I should like to do some trading in the stock market and with that in mind placed $20,000.00 and a goodly lot of Stock Exchange collateral with a broker in New York City.

For a while I was very successful and since I was trading in one thousand shares at a time, my cash balance grew rapidly. At no time did I lose any large amount. My account

grew until it was approximately $130,000.00. This was the beginning of 1907.

Then the panic of that year came and my profits were totally wiped out in a few months. Fortunately I had not taken anything out of this account so I ended up with about $300.00 profit for all my effort and trouble.

Never again did I attempt to beat the stock market.

Sarah
(Mrs. Graham Kenan)

CHAPTER XII

MY ASSOCIATION WITH R. B. GOODMAN

During the Fall of 1902, Mr. Robert B. Goodman, of Marinette, Wisconsin, a graduate of Cornell University, who I had met at the University Club, Niagara Falls, and was the Resident Engineer on the Gorge Railroad, when that was built, and the finest individual I ever met. Together we joined forces and purchased Gas Plants at many places.

At this time the conversion of coal (or retort) gas plants to water gas was taking place. We purchased several, some of which were:

Bayonne, New Jersey
Saugerties, New York
Jacksonville, Florida

We modernized them, developed the business, and sold them at a very handsome profit.

At Jacksonville they were selling, at the time of our purchase, 70,000 cubic feet per day, and competing with a municipal electric light plant. In two years time we were selling 540,000 cubic feet per day.

At Saugerties, when we purchased, the sales were 1,250,000 cubic feet per year. The last year we operated we sold 35,000,000 cubic feet.

At this time the Welsbach gas burner came upon the market, and improved gas illumination very greatly. We did not go into this to any great extent. However, we concentrated our efforts on Gas Ranges, Gas Water Heaters and Internal Combustion Engines, which accounted for the very large increase in the sales of gas.

We also made a survey and proposition to take over the Gas

Plant and Electric Plant at Wilson, N. C. This was contingent upon our survey of a proposed Hydro-Electric development near Wilson. The deal fell through due to the survey disclosing an insufficient amount of water to produce the necessary power required.

Shortly after my father died in 1903, it was suggested that my mother purchase another home in Wilmington, with more modern conveniences than were in our old home. After some investigation I learned that the brick three story house on the corner of Third and Orange Streets, which had not been occupied for several years, could be purchased. After inspection by all of the family and some negotiations the house was purchased, and I was requested to make plans for changes and improvements which my mother requested. This was promptly done, by putting a conservatory in the living room with a bath room above, also adding two more baths complete and modern in every way, a new heating plant using egg coal, and two new mantels with rebuilt fire places and modern electric fixtures.

There was a well built brick stable on the lot which we converted into a very satisfactory garage.

My youngest sister Sarah was of course living with my mother and after her marriage continued to live there, and was living there when my mother died in 1916. Her estate was left equally to her four children, but we all were of the opinion that Sarah should have the house and all contents, so this was done.

I was elected Director and President of the Saugerties Gas Light Company, Saugerties, N. Y., November, 1902, and elected a Director and Chairman of the Board of the Citizens Gas Company, Jacksonville, March, 1905.

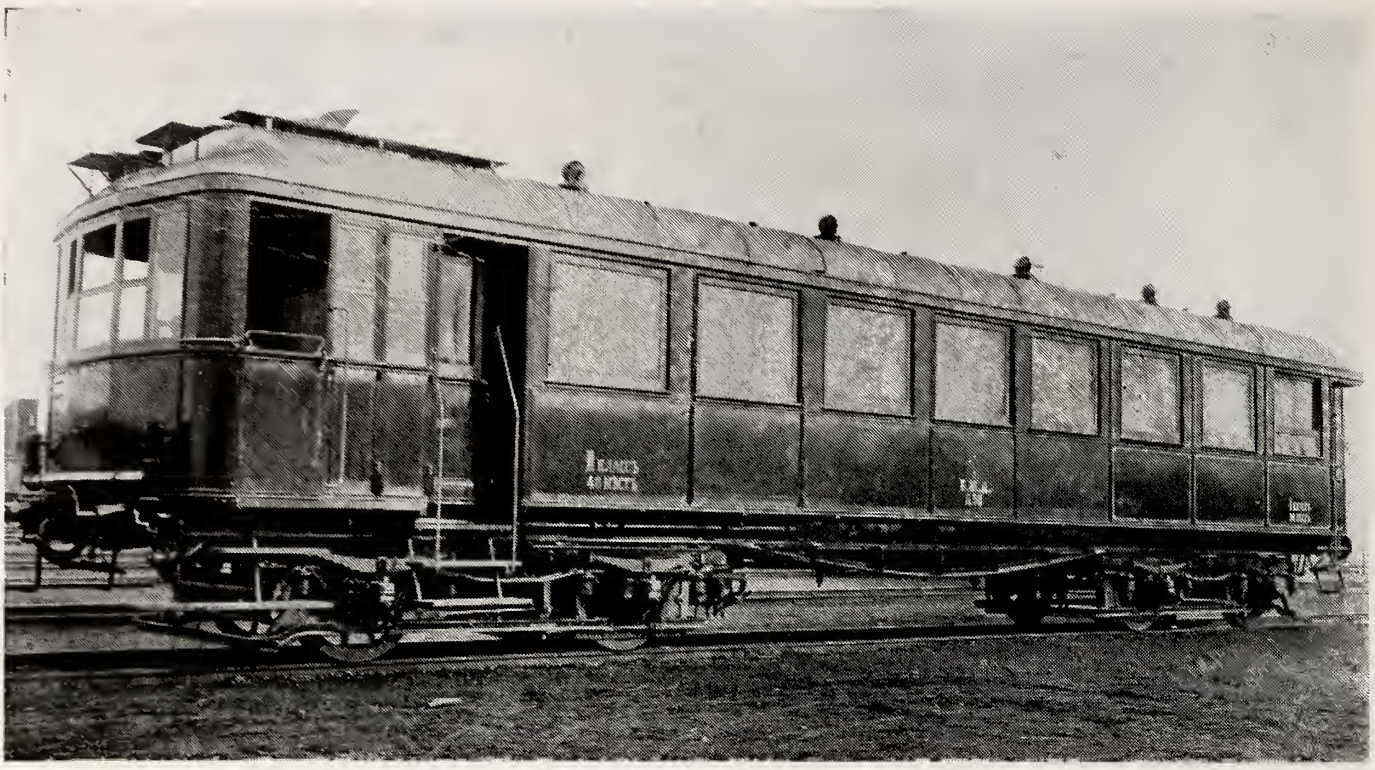
In the Fall of 1904 I was sent to Europe to investigate Automobile Railway Cars for use on branch lines. This detail took me to Hungary, France and England. Mrs. Kenan accompanied me on this trip. I also investigated the Ganz Three-phase

Traction Equipment on the Valtillina Railway, at Lake Coma, Italy. I purchased a Railway Autocar from Ganz & Company, Budapest, Hungary, for the Florida East Coast Railway. It had a Flash Steam Boiler with motors attached to the trucks. The cost of operation was very low. It was shipped to New Orleans and I went there to install the motive power and it was operated from New Orleans to St. Augustine by means of it's own power. It was used in branch line service until it was worn out. A company was organized to build these in this country but the competition with Diesel-Electric was too stiff,—and operation was never started.

202 South 3rd St.

In March, 1904, I was elected Director of the Florida East Coast Railway and Florida East Coast Hotel Companies.

On April 9, 1904, I was married to Miss Alice Mary Pomroy, Mrs. Kenan was born in Lockport, N. Y. attended the public schools and finished at Mrs. Peates Girls Finishing School at



Ganz Railway Steam Auto Car

Utica, New York. Our wedding trip was of six weeks duration to the West Coast, going via Denver & Rio Grande, stopping at Denver, Salt Lake City, San Francisco, Los Angeles, Pasadena and returning the Southern route, through San Antonio and New Orleans.

During the time I was courting my future wife, she was debating the fact that she was several years my senior. In speaking to Mr. Flagler about this, he replied: "That young man was fifteen years old when he was born, so don't worry about that situation".

My wife
(Alice Pomroy Kenan)

The Carolina Apartment, 1905

CHAPTER XIII

THE CAROLINA APARTMENT COMPANY

During the early part of 1905 Mr. Thomas H. Wright, a boyhood friend and in the real estate business in Wilmington, N. C., suggested that we join forces and build an apartment house. I was not interested and he went it alone. After he got out the plans and sent them to me, I felt that the whole thing was too small a scale, and proposed that if he would let me get out some plans and supervise the construction, following it to completion, then he to take over from that point and I not to be called upon for any assistance, I would go along on a 50-50 basis. This was done and has proved a satisfactory and pleasant arrangement.

During the winter of 1905-'06 we constructed an apartment house containing thirty-eight apartments for the Carolina Apartment Company, Wilmington, N. C. and during February, 1907, I was elected Director and President of this Company. Mr. R. L. Shape, of New York City was the architect. Central Carolina Construction Company, was the contractor. E. Gibon Company, of New York City, did the steam heating and plumbing.

During 1905 and 1906 I spent considerable time in the development of Gas and Electric properties in connection with Engineering.

CHAPTER XIV

THE WESTERN BLOCK COMPANY

For six years I had passed the Western Block Company, going to and from the Traders Paper Company, but had never been inside the plant, although I had known Mr. Shaw intimately during this time.

I did not have any information regarding this business although there was a rumor that it had paid out recently $12,000.00. Mr. Shaw told Mrs. Charles Weber and she told all her friends.

I was in Palm Beach, Florida, and a letter received from Mr. Shaw the early part of 1907 advising me that McGrath (his partner) wished to retire and he suggested that I purchase his one-half interest. I at once returned to Lockport and inspected the plant with Mr. Parker. I had on low shoes and no rubbers, there was so much snow that I got my shoes full walking around the grounds. I also inspected the books and then and there decided to purchase McGrath's stock for cash. I joined the organization on March 18th and was elected a Director and Treasurer on April 6th, 1907.

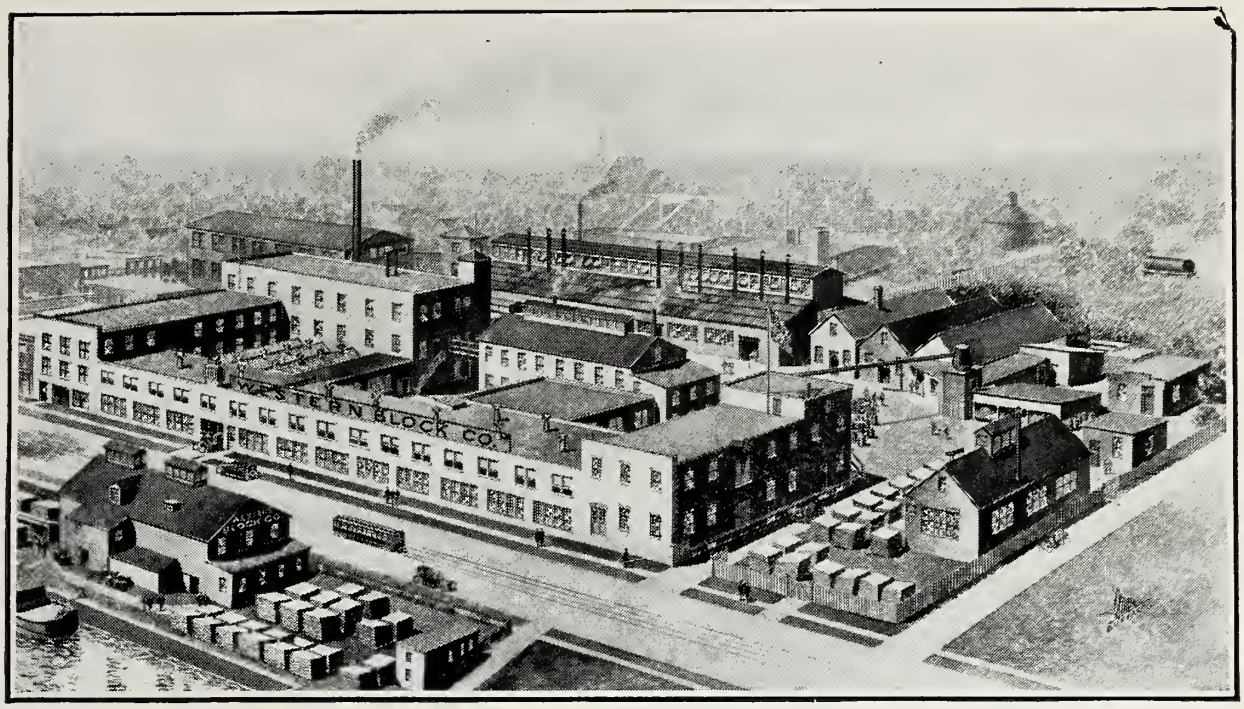
Business was very active and every one exceedingly busy. I saw the necessity of installing some labor-saving devices in the office and establishing a regular standard order system,—all of which was promptly done.

The office force was composed of the following:

Mr. Shaw, President.....Sales
Mr. McGrath, Treasurer.....Purchase and Finance
Mr. Parker, Secretary.....Superintendent
Miss Powers .....Bookkeeper
Miss Comstock .....Stenographer, Invoice and Shipping Clerk

We now have thirty odd in the office!

My private agreement with Mr. Shaw was to the effect that



Western Block Co.

he was to handle the sales absolutely without any interference and I was to do the same with Finance, Purchases and Manufacturing. As long as he lived we never had any differences regarding that agreement, except when I purchased all of the steel for our new building from Jones & Laughlin Steel Company.

During the Fall of 1907 we had a panic and there was no business at all!

I was giving serious thought regarding our employes and how to utilize them, if possible. I made some sketches of a building to fill in the vacant space along Market Street. I consulted Mr. Shaw and he approved, in a measure. I then made the plans and asked for bids on the steel. Jones & Laughlin offered to deliver in Lockport fabricated steel with all necessary bolts, rivets and separators, for $1.97 per 100 pounds. The price was so favorable that I decided to extend our operation and purchased steel to complete the whole job, which was composed of five parts. We constructed each separately and had the steel distributed in the driveway and along the street between

curb and sidewalk for nearly three years. We erected the steel and placed the concrete floors and roofs with our own employes,—only contracting for the brick work.

I am happy to say this connection was both pleasant and profitable. There was only $5,000.00 put in this business except the earnings a large part of which was plowed back. The expansion and growth of this corporation has been remarkable and could not be done under present existing income and excess profit taxes.

Elected Director of and on the Executive Committee Niagara County Bank & Trust Company December 2nd, 1912.

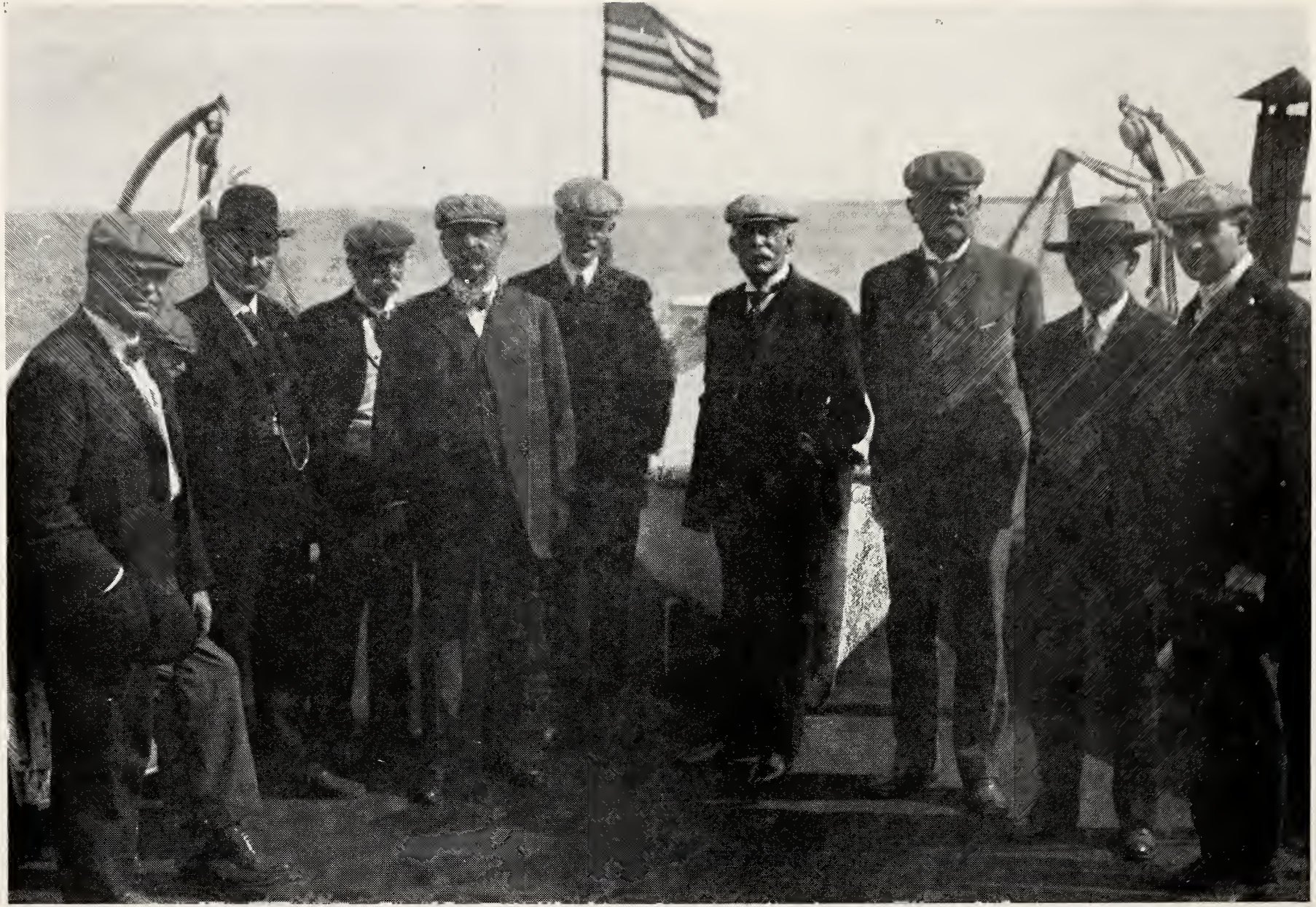
CHAPTER XV

H. M. FLAGLER TRUST

Mr. Flagler was born 1830 and died May 20, 1913. His will, made many years prior, named Joseph R. Parrott, William H. Beardsley and myself Executors and Trustees. He placed his property in trust "The said Trust shall continue for five years from the time of my death and if at the end of such five years the condition of the Florida East Coast Railway Company and the Florida East Coast Hotel Company (they being my Florida railroad and hotel properties referred to) or either of them should be such as to require financial aid from sources outside of themselves or itself, then I direct that such Trust shall continue so long as either or both of such last named companies shall require assistance but not longer, however, than a period of five years from the termination of the above mentioned or first period of five years." This was done. Many things were in the development stage, namely, operation of car ferries to Havana from Key West; the completion of the Over-sea Railroad to Key West and the Estate or Inheritance Tax, both federal and state.

Mr. Parrott came with Mr. Flagler as a lawyer and he for many years was at the head of that department, finally he was brought into the operating head of the many businesses and was made General Manager. This was about 1899. He was made Vice President and shortly prior to Mr. Flagler's death made President and at that time Mr. Flagler was made Chairman of the Board. All during these many years Mr. Parrott never gave up his control of the Legal Department. He had two leading understudies, St. Clair Abrams and A. V. S. Smith, both of these men were very dictatorial and were difficult to get along with.

October, 1913, I was elected Director and on the Executive Committee, The Record Company, St. Augustine, Florida. Also Peninsular & Occidental S.S Co., Jacksonville, Florida. Presi-



Mr. Flagler's Party, 1908

(Left to right): J. R. Parrott, *V. P. and Gen. Mgr.*; J. C. Meredith, *Cons. Engr.*; C. D. Vanaman, *Master Mechanic*; Capt. Marcotte; Senator J. P. Taliaferro; Mr. T. V. Porter; Henry M. Flagler, *President*; Major General John E. Brooks, *U. S. A.*; R. T. Goff, *Genl. Supt.*, and Wm. R. Kenan, Jr.

dent and Director West Palm Beach Water Company, West Palm Beach, Florida.

Mr. Parrott died in October 1913 leaving Mr. Beardsley and myself to carry on.

Much thought and discussion was given to his successor. He being at the head of all of our corporations as well as head of the Law Department.

Mr. Beardsley was of the opinion that we should select a New York City lawyer of national reputation. I leaned to the most outstanding lawyer in the south and, preferably, a Floridian.

I had a survey made of all the outstanding lawyers in the south and was much impressed with the record of Judge William A. Blount, of Pensacola, Florida. The more I investigated this matter the more I was convinced that the Judge was the man. I went to Pensacola one Saturday night to spend Sunday, without letting anyone know I was making the trip. I fully discussed the situation with him, detailing what we would require of him, both as a Trustee and General Counsel. He was most polite and attentive but stated that he had a very fine practice, owned his home, and did not wish to move from Pensacola. After many interviews in Jacksonville I persuaded him to try the connection and retain his home in Pensacola; he to reside in Jacksonville, and go home when convenient.

The arrangement worked splendidly and everyone of us was happy about it. He brought to Jacksonville Scott M. Loftin, to be his Assistant, and this move was successful beyond words. Judge Blount was a brilliant lawyer of large experience and above all eminently fair and just. Unfortunately for us he only lived a few years after joining our enterprises and died in Johns Hopkins Hospital of stomach trouble.

Scott M. Loftin succeeded Judge Blount as General Counsel and still retains that position and I trust he always will as long as I live.

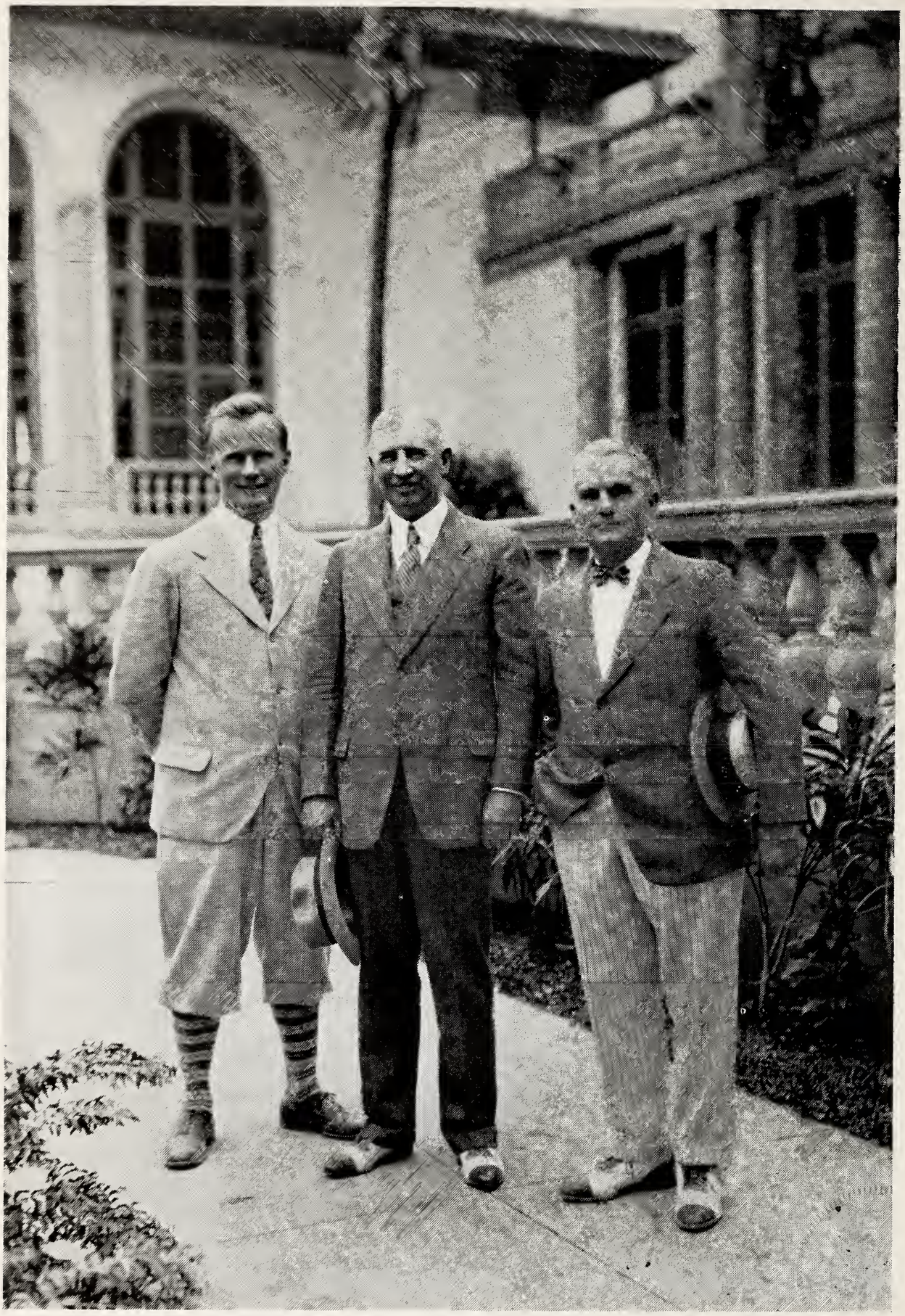
S. M. Loftin and W. R. Kenan, Jr., Palm Beach, 1939

One of the most novel and interesting experiences of my career was in connection with Mr. Lewis Cass Ledyard, one of the most successful and prominent lawyers in New York City (if not the most outstanding). Shortly after the death of Mr. Flagler, May 20, 1913, followed by the death of Mr. J. R. Parrott, in October, the same year,—the latter being head of all our corporations as well as directing our Law Department, I was much concerned about our situation, especially in regard to our legal status. After much deliberation I decided to consult my good friend Mr. Henry Walters. This I did. After a few minutes delay he said: "William, I will give you a letter to my good friend Lewis Cass Ledyard, and suggest you go to see him. He has just closed up a very large estate and, no doubt, has experienced some of the difficulties confronting you." I personally took the note to Mr. Ledyard. After reading it, he asked: "Did you see this note?" I had to reply "No!" since I did not read it. He said: "This is the most remarkable communication I ever received and if there is anything I can do for you, just call on me at any time." Of course I stated we would be glad to pay him a retainer of such an amount as would be fair and just. He very positively said "No! Any one who could bring such a communication from my good friend Harry Walters can have my advice and suggestions gratis and you may consult me any time you desire." I did consult him many times, which was most helpful and actually took Judge Blount (head of our Law Department) to see him several times. Mr. Ledyard never would take any pay and died without receiving any compensation for his services. This is most outstanding, in view of the large fees prominent New York lawyers are receiving. It has always been a great regret to me that I did not secure a copy of that note.

Shortly after Judge Blount died I had an attack of nervous indigestion. The pain was just below my breast-bone and felt as though a knife was struck in at that point and then twisted. I had the pain for about nine months every hour I was awake

Jessie
(Mrs. J. K. Wise)

and on some occasions it was so severe that I could scarcely stand up. I consulted numerous doctors both in Lockport and at the Railroad Hospital at St. Augustine. Had my stomach pumped out many times, swallowed the thimble and on each occasion the digestive juices were analyzed and no one could find out the cause. I was beginning to think that I had cancer. In discussing my symptoms with Mr. Walters he suggested that I go to see Dr. Lodowick Kast of Madison Avenue, New York City, an Austrian, who, he considered the most expert stomach specialist in the United States. I did so, he made every known test during ten visits and then reported that there was nothing organically wrong with me, it being a case of nerves, and I would have to cure myself. His argument was as follows: "You are an engineer and must understand that when one purchases a steam boiler to be operated at 150 pounds pressure, the builders test it hydrostatically for approximately 187½ pounds. When installed and insured the Inspector test the safety valve for 150 pounds. If the boiler is operated beyond it's capacity and neglected, the Insurance Inspector would gradually reduce the operating pressure each year until they would not insure it any longer and the boiler would be scrapped. He said a similar result would happen to me,—that I should give up my business for at least six months, take it easy and a total cure would result." I stated it would not be necessary to take a vacation if it was only nerves. I would stop being nervous by not worrying over anything. This I did and only once since in 20 years have I had that pain.



John Greene, *Manager, The Breakers Hotel;* W. R. Kenan, Jr., *President, F. E. C. Hotel Co.,* and H. E. Bemis, *Manager, Royal Poinciana Hotel,* 1926

CHAPTER XVI

BREAKERS HOTEL

The Breakers Hotel at Palm Beach was a wooden structure and was built during 1900, opened December 21st, replacing the Palm Beach Inn, which faced south; had dressing rooms and bathing facilities on the ground floor and only bed rooms on the floor above. This floor was reached by wide stairs from the south. There were no dining, kitchen, etc. It took the place of a Bathing Casino. In after years one was built.

The name "Breakers" was suggested by my good wife. In June, 1905 it was damaged by fire so badly that it was torn down and the second Breakers constructed in 1906. This was also of wooden construction and it burned in the spring of 1925 just before the house closed for the season.

We then reached the conclusion that we should rebuild with fireproof construction and attempt to make the Breakers the finest resort hotel in the world. Work was started in January, 1926, and the hotel was opened in December, the same year.

The site was ideal, on the ocean, and its reputation for good service and food was world-wide. The question of an architect arose. The most prominent architects who I had known for many years were anxious to get the job. They were Kenneth Murchison, who did the Colonial at Nassau and many other structures; Henry Bacon, who did the Lincoln Memorial, at Washington; and Jack Pope, who did the National Art Gallery for Mr. Mellon, at Washington. I could not give the job to all three and I decided that to give to either one the other two would get mad, so I decided to have an outsider. I had an apartment at the Park Lane, 299 Park Avenue, New York City, and learned that Leonard Schultz had been the architect and also had done most of the furnishings and decorations. I had never met the gentleman, so called him on the 'phone and asked him to call at my office, which he did. I told him about

our desire to build the Breakers and make it the best in the world, that I was going to give him the job on one condition, that it was his job and he personally was to direct it until completed. This he readily agreed to do. We decided on Italian architecture and he made a trip to Italy, selected copies of many ceilings, pieces of furniture, samples of small rugs with suitable colors and design and returned here with them. There is not an original thing in this house, but the result was beyond words.

The Breakers has more public space and more light and ventilation than any hotel of it's size in the country.

Mr. Schultz drew the plans of a typical bed-room set; had one made by cabinet makers in New York City and then had the furniture manufacturers bid to reproduce sufficient sets to equip the hotel. This plan produced an exceptionally good article.

At one of my interviews with him I suggested that he and his organization do the furnishings and equipment. His reply was that he could not do it. I said you did the Park Lane with grand results, and you could select materials etc. and our purchasing department, located in New York City could do all the details. To this he replied that he would not know what to charge. Finally I persuaded him to take the job with his statement that when completed I could pay him any amount which I considered it worth. He rented a loft in the city, built a typical bed room with bath and installed the windows, doors, and all equipment including the hardware. He painted the trim, walls and ceiling many times to get the right combination, had several carpets woven and placed on the floor; about twelve different pairs of hangings for the windows; then put in the electric fixtures and made a completely equipped room. This took many months, but was a grand success when completed. He also prepared a book (which was called "the bible") which contained a description of each piece of furniture, sample of the upholstering and also samples of carpet and hangings in

each public room and the location of each piece, as a record to be used for future information.

When the hotel was opened and in operation, December, 1926, I requested a bill for his services as decorator, but he still insisted that I could pay him anything. After much discussion it was finally agreed that both of us would place an amount on a piece of paper and then expose it. In the meantime I had secured the total cost of the work he had done and had some idea as to what would be fair and just. Strange as it may seem, when we exposed our figures they were both the same and every one was happy.

Mr. Schultz has done many things for us since then and always with excellent results. He is the only architect I ever met that knew the value of a dollar. He never wishes to do anything unless you are sure to get full value from it.

CHAPTER XVII

I MOVED TO LOCKPORT, N. Y.

When I moved to Lockport, during the first week in June, 1900, I resided for a few weeks at the Kenmore Hotel on Main Street. Mr. Ashley was remodeling a frame house, corner of Genesee and Cottage streets, and I persuaded him to finish at once the apartment on the second floor corner for me to occupy. This was done and I moved in before the rest of the house was completed. The apartment consisted of a nice large corner living room, and medium sized den, which I used as an office, connected by double doors; a small bed room and modern bath. I at once made a floor plan and two sectional elevations and sent them to my mother in New York City. She took them to Wanamaker's and purchased everything for the completed apartment. All the furniture, rugs, hangings, pictures, etc. including a folding bed which I placed in the den and used normally as a sideboard.

I lived at the above address until we were married in April, 1904, when I moved into my wife's home at 242 Genesee Street.

I purchased a residence on what is known as "The Hill" containing 6¾ acres during March, 1912, and obtained possession April 1st, at a cost of $18,500.00. It was a brick house of Central New York architecture, well constructed, with all main partitions of brick; outside walls consisted of 13″ brick, 8″ air space and 8″ inside walls, the plaster being attached to the inside wall. Heating was done by means of fire places and there was one, including a marble mantel piece in each room including the kitchen. There were two in the living room, one at each end. I started work almost immediately. Did not have any architect nor contractor, simply employing several carpenters, two plumbers and helpers and several painters. The house is 50 feet front and 96 feet deep, with a side entrance and a main hall running through the house with vestibule at one end and conservatory at the other.

433 Locust Street, Lockport

There was a cellar under the entire house with a good high ceiling and the main brick partitions going down through the cellar, making the same a duplicate of the first floor arrangement. The first floor ceiling height was 12′ 8″ the second floor 11′ 4″ and the attic was 5′ 4″ at the eaves. The general plan of the building could not have been improved upon. The two bath rooms were large but not modern and all the water pipes were lead (we removed more than two tons). I converted two closets between the two front bed rooms into a grand bath and put in a bath for the servants, also running water in two servants rooms and modernized all bath rooms. I also put in a vapor heating system with automatic stoker, which has been entirely satisfactory for over thirty-two years. All gas piping was renewed as well as all electric wiring with attractive modern fixtures from Caldwell's in New York City. All the windows are extra large and on the first floor, and second floor front extend from floor to ceiling. The living room contained seven such large windows. The constructions of

Inspection Trip, F. E. C. Railway Officials, 1925

the house was such that it was cool in summer and easy to heat in the winter. I installed all brass pipe for water with brass fittings and used gate valves everywhere so as not to reduce the pressure. Each fixture had shut-off valves and a drain valve in the cellar. This made it possible to repair any fixture without shutting off the water from any other part of the house. I installed an Audiffren Refrigerating machine and the Sulphur Dioxide gas placed in the machine is still there, giving satisfactory results. The changes, repairs and modernizing, including hangings, carpets and furniture cost $14,510.95.

We moved in on June 14th, 1913, and have resided there ever since. Sometime latter I purchased 8¾ acres of unimproved land to the rear and adjoining, on Beattie Avenue. This is used to produce feed for the chickens, ducks and turkeys raised on the place. During the late 1928 Mrs. Kenan purchased two Italian oil paintings size 4′0″ x 5′0″ and I purchased an original Gainsborough, a little smaller than the others.

After much discussion we concluded that the living room should be done over in order to properly place the three pictures. I consulted Mr. Leonard Schultz, Architect, of New York City (who had done The Breakers at Palm Beach for us) and he redesigned the room to take the pictures and also built in two books cases between the three front windows, at a cost of $35,142.03, including all new hangings and electric fixtures. He also redesigned and modernized our front bath room at a cost of $7,222.19. All of the above was done by the Turner Construction Company, of New York City, and was started during January, 1929.

March, 1914, I was elected Vice-President of the Florida East Coast Railway, Vice-President of the Florida East Coast Hotel Company and also of the Florida East Coast Car Ferry Company.

I have recorded in previous Chapter II, how my father encouraged my interest in hunting by giving me a gun at a very early age. Not only did he take me with him on his hunting

1705 Market Street
(Sarah's home)

trips but supplied me with various types of guns until I had a complete outfit.

Theodore Empie, a boyhood friend of mine in Wilmington, N. C. lived only a short distance from my home and for many years we hunted the woods adjacent to Wilmington with great pleasure and much success. Empie and I constructed and installed a telephone circuit between our homes, the first one in North Carolina.

I had not shot a gun since leaving college in 1894 until 1927.

CHAPTER XVIII

STADIUM AT THE UNIVERSITY OF NORTH CAROLINA

The Stadium at the University of North Carolina was to be dedicated on November 24th, 1927. Mrs. Kenan and I planned to be present and I invited Mr. and Mrs. J. M. Morehead, of Rye, N. Y. to accompany us as my guest on my railroad car "Randleigh". We left New York City for Durham, N. C., stayed at the hotel and motored to Chapel Hill, twelve miles distance each day. When returning we proceeded to Dansville, Va. and motored to Spray, N. C., Mr. Morehead's former home. They had retained the old homestead and all the acreage attached and were in the habit of having friends accompany them each Fall for several days quail shooting. They had about a dozen hunting dogs and they fed the quail to keep them on the farm.

Several New York City men joined us and as they outfitted me completely, it was hunting under ideal conditions. I had not fired a gun in 32 years and of course was somewhat nervous as to the results. However, during two whole days my kill was just as good as those who had been hunting each year. To say that I enjoyed it is putting it mildly. I have never hunted since, except to shoot a few starlings that attempted to roost in the trees at our home.

CHAPTER XIX

FISHING

As a boy I enjoyed fishing and did a good deal of it at Wrightsville Beach, N. C., both in the sound and in the ocean. We caught Pig Fish (or grunts) and they were the finest pan fish to be had. Also Sheepshead, Blue Fish, Spanish Mackerel, and, in the ocean, Channel Bass (Drum) by casting into the serf with a lead line. This fish frequently weighs over fifty pounds. I also fished many times at Smithville (now called Southport), at the mouth of the Cape Fear River.

After I left the south to reside I did not fish any until 1925 when five of my friends and myself went to Oak Orchard Lodge in the Kawatha Lake District, about 225 miles from Lockport. This location on the narrows between Pigeon Lake and Buckhorn Lake was most comfortable and we enjoyed our stay very much. We had Indian guides and fished from a canoe, most of the time casting with light tackle and trolling when moving from one location to another. We caught Black Bass, Green Bass and Muskellunge. We took three motor cars loaded with our equipment, two men to each car; motored to Toronto and went northwest to Peterborough, Ontario, and back into the woods 16 miles. The nearest inhabitants was the Indian Village about five miles down Buckhorn Lake.

For nine consecutive years the same six persons made the trip spending the first two weeks in August. We fished each day from seven in the morning until six at night, taking about an hour and a half for lunch, which the guides always prepared. I had the same Indian guide all nine years and he would paddle me about all day in addition to the trip to and from the Indian village and he was about 75 years old. We used artificial bait most of the time.

I also went to Wolf Island, opposite Kingston, Ontario, at the head of the St. Lawrence River, several times for Bass fishing, although this was still fishing with live bait.

CHAPTER XX

MY TWO SISTERS' HOMES

Shortly after her husband died, my sister Sarah decided that she would like to live nearer our sister Jessie, who had purchased a home at 17th and Market Streets. She was able to purchase a brick house of Colonial type at the corner of 16th and Market Streets. Tom Hastings of Carrere and Hastings, New York City Architects, was employed to make some changes, additions and modernize the house which was done—most successfully.

Several years later during the late spring the girls had planned a motor trip through Italy and France, having as courier Francesco Pisa, when just one week before leaving for New York to sail, a fire broke out in the attic of Sarah's house —probably an electric wire. She was notified by a person passing on the street and seeing a light in the attic window. She was aroused by the continuous ringing of the front door bell. She and the servants were able to get out of the house, and the neighbors removed most of the furniture on the first floor. However, everything on the second floor was consumed, including her clothes, etc. The fire had been in progress some time when she remembered that all her jewels were in a safe on the second floor. Much against the firemen's vigorous protests she went back, worked the combination and brought out all of the contents of the safe. This occurred the latter part of June, 1931.

Sarah called me on the telephone and explained the situation. I stated that I would come to Wilmington at once, which I did. My advice was to go to New York City, purchase a new outfit and cable Pisa to cut out the first week of the motor trip and that you would take the following steamer. I would file your proof of loss and arrange to have the house rebuilt, all of which was carried out. I arrived in Wilmington on a Saturday morning and that afternoon got Mr. Leonard Schultz, an Archi-

tect of New York (although I had to reach him on the golf course) and he came down, arriving Monday morning. We had some photographs of the first floor made, and as my sister wished the house replaced as near as the original, this was done, except we constructed a fire-proof building, by removing everything except the four outside walls, and placing a steel frame inside, and making all floors with slab-concrete construction to support the hardwood floor. Unfortunately we were not able to complete the job before she returned although we came within a few weeks of accomplishing it.

During the first few years after 1900 I spent the greater part of the winter in Lockport, making frequent trips to Florida. After I was married we spent several winters both at The Breakers Hotel and Whitehall, Palm Beach, but I did make frequent trips to New York. After Mr. Flagler died it was our usual custom to spend the winter at the Ponce de Leon Hotel at St. Augustine, where we have a very comfortable apartment. During these winters I always made six to eight trips to New York and at least one to Lockport. It was more convenient for me to reside at St. Augustine since the Main Offices of all of our Florida corporations are located there. The executive office and purchasing department being located at 120 Broadway, New York City.

During World War Two the Ponce de Leon was occupied by the Coast Guard and we spent three winters at the Buckingham Hotel at St. Augustine. During this period, on account of travel conditions, I made only two trips to New York and one to Lockport.

1713 Market Street
(Jessie's home)

CHAPTER XXI

SOME POSITIONS HELD

Date Elected	*Name of Corporation*	*Office*
February, 1907	Carolina Apartment Co., Wilmington, N. C.	President and Director
April, 1907	Western Block Co., Lockport, N. Y.	Treasurer and Director
December, 1912	Niagara County Nat'l. Bank, Lockport, N. Y.	Director
October, 1913	Miami Electric Light & Power Co., Miami, Fla.	President and Director
October, 1913	Miami Water Co., Miami, Fla.	President and Director
October, 1913	Record Company, St. Augustine, Fla.	Director & Ex. Com.
October, 1913	Peninsular & Occidental Steamship Company, Jacksonville, Fla.	Director & Ex. Com.

Directors, Niagara County National Bank, 1919

Date Elected	*Name of Corporation*	*Office*
October, 1913	West Palm Beach Water Co., West Palm Beach, Fla.	President and Director
March, 1914	Florida East Coast Railway, St. Augustine, Fla.	V.-Pres. & Director
March, 1914	Florida East Coast Hotel Co., St. Augustine, Fla.	V.-Pres. & Director
March, 1914	Florida East Coast Car Ferry Co., St. Augustine, Fla.	V.-Pres. & Director
March, 1922	Florida East Coast Rwy. Co., 120 Broadway, N. Y. C.	Executive Vice-President
March, 1922	Florida East Coast Hotel Co. 120 Broadway, N. Y. C.	Executive Vice-President
March, 1922	Florida East Coast Car Ferry Co., 120 Broadway, N.Y.C.	Executive Vice-President
March, 1923	Model Land Co., St. Augustine, Fla.	President and Director
March, 1923	Perrine Grand Land Co., St. Augustine, Fla.	President and Director
March, 1923	Chuluota Land Co., St. Augustine, Fla.	President and Director
March, 1923	St. Augustine Golf Development, St. Augustine, Fla.	President and Director
March, 1924	Florida East Coast Rwy. Co., 120 Broadway, N. Y. C.	President and Director
March, 1924	Florida East Coast Hotel Co., 120 Broadway, N. Y. C.	President and Director
March, 1924	Florida East Coast Car Ferry, 120 Broadway, N.Y.C.	President and Director
March, 1924	Jacksonville Terminal Co., Jacksonville, Fla.	Director
March, 1930	Fruit Growers Express Co., Washington, D. C.	Director-Ex. Com.
September, 1931	Florida East Coast Railway 120 Broadway, N. Y. C.	Co-Receiver
March, 1935	Railroad Credit Corp., Baltimore, Md.	Director
August, 1935	American Power & Light Corp., New York City	Director-Ex. Com.
Feb. 1, 1939	Western Block Co., Lockport, N. Y.	Pres.-Director-Ex. Com.

Date Elected	*Name of Corporation*	*Office*
April, 1941	Peninsular & Occidental Steamship Co., Jacksonville, Fla.	V.-Pres.-Director-Ex. Committee
June, 1943	The American Jersey Cattle Club, New York City	V.-Pres.-Director-Ex. Committee
June, 1945	Niagara County Bank & Trust Co., Lockport, N. Y.	Chairman of the Board

CHAPTER XXII

MOVIE CAMERA

Travelling about so much (for a great many years I was on a train two nights each week), I never found it convenient to become a base-ball fan, and playing an indifferent game of golf, I have not developed into an enthusiast at that, or any other line, so I have little to say of my recreational hobbies, except I might mention that I have derived a great deal of pleasant recreation taking and exhibiting moving pictures.

This started in 1927 when my good wife gave me a Bell-Howell 16 M.M. Movie Camera, probably the best camera made at that time. I was not interested in photography and for a time did not use it to any extent except occasionally taking some cattle pictures at the farm.

In the early summer of 1929, we made a trip to the Canadian Northwest, Ranier Park and Glacier Park, and I took many pictures under all conditions and got remarkable results. These of course were only black and white pictures. From these results I got the bug and have gotten much pleasure taking pictures from the air, from the rear of trains in operation, etc. I started taking pictures from the air over Niagara Falls, and at that time there was no information obtainable, so I learned by trial and error method. I took the great slide at Niagara from a plane the morning after it occurred. Three days after the Hurricane damaged the Florida East Coast Railroad from Homestead to Key West I took a plane and flew over the entire line, down and back taking a continuous picture of the damage.

The twelve consecutive years up to World War II I spent each winter at St. Augustine. I have taken pictures of both the Girls' Golf Championship and the Men's Professional Championship, and most of these have been in colors.

Mrs. Kenan each year would give a dinner for the Girls,

Mayor of Miami; S. M. Loftin; W. R. Kenan, Jr., and Mayor of Jacksonville, 1939

approximately 25 to 26 of the better players. I was the only man invited to be present. The table decorations always referred to golf in some way, and she always gave to each an attractive souvenir.

I usually took approximately 400 feet each tournament and this was shown the following year with three or four additional reels of 400 feet each, making a showing of about 1¼ hours.

It was my practice to show each year at my home to my friends and associates, pictures previously taken in Florida, and elsewhere, until it has grown to be a rather historic occasion and I am told eagerly anticipated by many. The best pictures in color which I have taken were the Canadian Northwest including Victoria.

W. R. Kenan, Jr. and Helen Hicks Harb

(Amateur Golf Champion, 1932)

CHAPTER XXIII

THE PARK LANE

When I moved to Western New York (both at Niagara Falls and Lockport) to reside, I made many trips to New York City, —an average of once each week,—except while I was out of the country. I resided first at the Manhattan Hotel (operated by Hawkes & Weatherby) corner of Madison Avenue & 42nd Street. It was a fine hotel and splendidly operated. When it closed, during 1919, we floated around the Grand Central Terminal, staying at the Biltmore, Commodore, and others, until we located at the Ritz-Carlton, remaining there nearly two years.

In 1924, when the Park Lane was constructed by Schultz & Weaver, we decided to go there. We moved in September 12th 1924, and have been in the same apartment continuously since that date.

We have a four-room apartment with two baths, a Kitchenette and entrance way on the top floor, at the rear of the building, corner apartment having North, East and South exposures. It has been most comfortable and we have enjoyed it greatly, especially as many of the servants that were in the building when we moved in are still there.

During War II it has relieved us of much worry since it has been almost impossible to obtain any accommodations at any hotel during that period. As we rented this apartment by the year it was possible to have an entire outfit of clothes there and made it possible for us to travel back and forth with only an over-night bag. It is almost like home to us after so many pleasant years of residence.

CHAPTER XXIV

PRIVATE RAILROAD CAR "RANDLEIGH"

It might prove of interest to some one for me to relate my experience with private or official railroad cars. The F. E. C. Rwy. had three such cars which were used by the executives. I had the pleasure of riding in them many times, and it occurred to me that I might enjoy owning one myself. During 1914 my sister (Mrs. Flager) requested me to have constructed for her such a car as would be suitable for a lady's use. I confererd with the Pullman Company and we designed and they constructed an all steel car, with an extra large Observation Room, large Bed Room, with Dressing Room and toilet attached and two small rooms, together with a large Dining Room. The car's interior was finished in Satin Wood and was fully and beautifully equipped. I enjoyed working out the many details and felt that we had produced a wonder job. When she died in 1917 the car was sold to Canadian Pacific R. R. at a very satisfactory price. Although I still had a desire to own a car I felt that this one was too much of a Lady's Car and would not meet my needs. I continued to investigate the question of a car and discussed it many times with the Pullman officials. In December, 1920, they advised me that one of the Moore Brothers, who recently died had a car built by them, in first-class condition, and they suggested that I purchase it. This was consummated and the Pullman Company added some features that I desired. It was a steel underframe, wooden superstructure, with steel plating on the outside and looked modern in every respect. Its interior was finished in Mexican Mahogany and had two large bed-rooms with toilets, one small room, medium sized observation and large dining room, with two section berths adjacent. I paid $22,000.00 for it, and it was a good buy. Of course I added many small features and equipment and sold it to the F. E. C. Ry. in September, 1926, for

just what it cost me. The car was named "RANDLEIGH" after my farm in Lockport, New York.

While using the above described car, I was thinking of the many improvements which a new car could have, which could be obtained only if I started from scratch. I made many floor plans and some detail notes of what could be done and, during December, 1925, I sent the plans to the Pullman Company and ordered them to build a car for me. The agreement was on a cost plus basis, since I insisted that we use the best material and equipment obtainable, whether produced by the Pullman Company or other manufacturers. The trucks, draft gear, cast steel ends, and many other parts were not made by the Pullman Company. It was delivered in June, 1926. Mr. E. S. Smith, Master Car Builder, of the Florida East Coast Ry. was consultant and followed the construction of same in all details, making many trips to the Pullman plant.

The car was an all steel car lined with American walnut waxed and had two large bed rooms, with dressing rooms and toilets attached; two small bed rooms, with toilets; a large dining room, large observation room, butler's pantry and kitchen and crews quarters sufficient for three men. A bath room in the center of the car with regular porcelain tub and shower, also a shower and toilet for the crew. The car was 85'0" overall. —when built the longest car in existence. I had quite an argument with the builders because of the length. We took it everywhere and never had any trouble about clearance.

The observation room was sherry color; Mrs. Kenan's room was apple green; owners room was tan; dining room was blue. All hangings, carpets, bed covers etc. were in harmony with the separate colors of each room.

The car was named "RANDLEIGH" which all the equipment carried as well as the monogrammed initials of the owner. The car was air-conditioned throughout and was the best job I have

Car "Randleigh"

seen. The control was so perfect that in any room you would not notice any circulation of air or draft.

The linen—both table and bed—was all pure linen, made in Ireland. The blankets were all wool, first quality in color to match the rooms. The glass-ware was of special design and made in Czechoslovakia. The china was specially made in Bavaria. The carpets were of a special design, made to match in color each room, by the Hartford Biglow Co. The cost of the car equipped was $92,000.00. The weight empty was just under 200,000 pounds.

I was extremely fortunate in having excellent servants. Kenneth W. Calhoun, Sr., was my Steward; A. J. Granger,—and when he died John Sterling—was my chef; Charles Owen or Leroy Calhoun was the Porter.

Kenneth came to St. Augustine with Mr. Riddle, General Manager, F.E.C. Rwy., as a butler in his home. When Riddle died we placed Kenneth in charge of the official cars. Mrs. Flagler took him on her car in 1914 and when she passed on I took him for my car. He has proved loyal, efficient and in every way satisfactory.

We took many trips for pleasure, on each trip the same persons accompanied me. Mrs. Kenan, my two sisters (Mrs. Wise

Bed Room

Observation Room

Dining Room

and Mrs. Graham Kenan) and Warren E. Smith, my Secretary in New York City.

Partial list of trips taken in car Randleigh:

		COST
1927	Trip to West Coast, southern route and Yellowstone Park	$4,263.00
1929	Trip to Canadian North West, Ranier Park, and Glacier Park	5,732.03
1931	Trip to New Orleans	2,458.28
1933	Trip to Havana, via Miami	727.57
1933	Trip to Chicago, World's Fair	403.81
1937	Trip to West Coast, San Francisco, Los Angeles and New Orleans	4,960.73
1940	Trip to Canadian Northwest, Victoria and Glacier Park	4,218.25
1940	Trip to Havana, via Miami	485.75

On the trips to the West the car was brought to Lockport or Buffalo, in charge of the crew, and we started from this point.

CHAPTER XXV

AUTOMOBILES

One of the hobbies which gave me much pleasure and became a great convenience was automobiles. In 1899 at Niagara Falls I purchased a Locomobile Steamer. This car had a verticle fire tube boiler under the seat, a two-cylinder verticle slide valve engine, with sprocket and chain drive. The water tank capacity was only good for about ten miles. The car had bicycle wheels and steered with a lever.

The Electric Stanhope 1900—had a carriage body, rubber tires, pneumatic, but no inner tubes. The set of batteries was half the load, and, as my charging outfit was located in Lower Town, a good portion of each charge was consumed getting up Market Street hill. This was the first motor car brought to Lockport.

The Auto-Car had a horizontal opposed two-cylinder engine in front, 12 horsepower; had a rear entrance door,—touring—with wicker baskets on each side, and was painted green.

The S. G. V. Town Car was made in France and had an automatic shift.

In the earlier days Mrs. Kenan used to say: "You get more pleasure taking the cars apart to see how they are constructed than operating them."

Year	*Make*	*Model*	*H.P.*	*Cost*	*Operation Per Annum*
1899	Locomobile	Steam	5	$ 600.	$ .....
1900	Columbia	Elec. Stanhope	5	1000.	78.97
1901					70.00
1902					89.00
1903	Auto-Car	Rear Door Touring	12	1950.	61.27
1904	Peerless	Touring	20	3100.	273.44
1905	Peerless	Touring	24	3600.	367.84
1906	Peerless	Touring	24	3600.	272.50

Electric Stanhope, 1900

Year	*Make*	*Model*	*H.P.*	*Cost*	*Operation Per Annum*
1907	Peerless	Touring	30	4350.	196.62
1908	Peerless	Touring	30	4350.	676.90
1909	Peerless	Touring	30	4350.	769.84
1910	Peerless	Touring	30	4350.	556.17
1911	Peerless	Touring	40	4650.	1346.73
1912	Peerless	Touring	40	4650.	1219.06
1913)	Peerless	Touring	40	4650.	
1913)	Peerless	Limousine	48	6000.	1250.00
1914	Peerless	(Same)			1668.24
1915	Peerless	(Same)			1627.71
1916)	Packard	Touring 12 cyl.		3350.	1707.51
1916)	S.G.V.	Touring	24	1200.	

Year	*Make*	*Model*	*H.P.*	*Cost*	*Operation Per Annum*
1917	Pierce-Arrow	Suburban	48	6200.	1500.36
1918	Buick	Roadster		1350.	1815.63
1919	Cadillac	Runabout		3500.	2573.74
1920	Pierce-Arrow	Touring	48	8200.	3569.55
1921	Buick	Roadster		1350.	2709.72
1922	Cadillac	Victoria		4200.	2906.95
1923	Pierce-Arrow	Lim. Landau		8500.	2384.97
1924	Cadillac	Victoria		4300.	2597.74
1925	Cadillac	Victoria			2687.26
1926	Cadillac	Victoria		3600.	2203.27
1927	Pierce-Arrow	Sedan Special		4350.	2310.69
1928					2795.86
1929	Pierce-Arrow	Conv. Cpe. Canary Green		4200.	2740.50
1929	Ford "A"	Station Wagon 4 cyl.		778.	
1930					2350.91
1931	Pierce-Arrow	Spl. All Weather		6850.	2970.16
1932					2270.51
1933	Ford	Station Wagon 8 cyl.		700.	2872.39
1934	Pierce-Arrow	Spec. Sedan (Huck. Blue)		4000.	2654.33
1935					2547.69
1936	Ford	Station Wagon 8 cyl.		700.	2869.48
1937					2651.51
1938)	Buick	Spl. Coupe		1358.70	
1938)	Ford	Station Wagon 8 cyl.		750.	2955.48
1939					2911.10
1940)	Cadillac	Sedan		2991.50	
1940)	Ford	Station Wagon 8 cyl.		895.	3180.53
1941	Cadillac	Coupe Model 61 (Included Fog Lights, Ventilate-Defroster, Heater, Leather Upholstering—complete)		1537.50	2988.20
1942					2754.67
1943					2361.00
1944					2681.40
1945					2707.39

TOTAL COST OF CARS $126060.70

Board of Trustees and Directors Y. M. C. A., Lockport, N. Y.
August, 1944

Seated *(left to right):* Supreme Court Justice William A. Gild; William R. Kenan, Jr., *President of the Board of Trustees;* James B. Neal, *President of the Board of Directors;* Dr. R. R. B. Braden Fitz-Gerald; Edward H. Boynton; Louis G. Merritt. Standing *(same order):* Charles V. Hageman; Erie D. Chapman, *'Y' Secretary;* Fred Zimmerman; Robert E. Bryant; Jay A. Noble; John Berent; William H. Hammond; Frederick Sang; Dr. Frank C. Weaver; John T. Symes; Chester O. Baysor; Dr. R. Raymond Baxter; J. Carl Fogle; Thomas D. Cole; W. Harrison Upson, Jr.; George Curtis Lewis, Jr., and Ellsworth Storrs. Egbert D. Corson *was the only trustee unable to be present when the picture was taken.*

CHAPTER XXVI

DOCTOR'S DEGREE

I attended my class reunion (50 years) during June, 1944, at the University of North Carolina and on that occasion I was given a Doctor's Degree. The exercises were held at 7:00 P.M. in the Stadium with the graduates seated in the lower rows of seats, with the spectators back of them. There were at least 2500 spectators. The platform for the speakers and the four honorary degree men was in the middle of the field with about 125 feet of green grass intervening. It was a gorgeous night, full moon and very bright. Each graduate's name was called and he or she would come across the grass up on the platform and receive a diploma and a bible and return to their seats. There were over five hundred graduates, so the exercises lasted past 10:00 P.M. The last thing was the honorary degrees. There were four of us. A citation was read by Dr. Graham, President of the University, as each individual stood up, the degrees being as follows: Doctor of Science, Doctor of Philosophy, Doctor of Medicine and I received a Doctor of Laws. Being uninformed on such subjects I concluded that a mistake had been made in my case, as it should have been Doctor of Science. Fortunately I did not discuss it with any one, when about a month later I ran across Dr. Odum, one of the older professors of the University, who, upon my request, explained that Doctor of Laws was the highest degree that any university or college could bestow, as it not only required the marks necessary for other degrees, but must have rendered service to humanity, such as my work with Randleigh Farm and also my work with the Y.M.C.A., Camp Kenan. All of the above shows how dumb we are about things that do not come to our attention in our peculiar scheme of life.

CHAPTER XXVII

HOW I SPENT MY MONEY

While I have recited in some detail how my time has been occupied, it seems fitting that I should relate just how I have spent some of my money, for, after all, this is the true measure of accomplishment "What did he do with it?" Other people know exactly what we ought to do with our money and do not hesitate to tell us, in word and print.

It is given to few men to experience the joy I have had in helping young people complete their education, young students who might otherwise have faltered by the way through lack of funds, and few men whom I have known have had the satisfaction of honoring the name they bear through such cultural memorials as the Kenan Fountain, erected in the city of my birth, and the Kenan Stadium, built for my Alma Mater, The University of North Carolina, at Chapel Hill, N. C.—that has thrilled thousands of people by its beauty; Camp Kenan, on the shore of Lake Ontario, at Barker, N. Y. which has been such a happy medium for many of the youth, not only in this immediate locality, but from other states, to develop health and character and to find themselves; and it has given me a lot of satisfaction to promote the varied interests carried on at Randleigh Farm, located three miles east of Lockport, N. Y., where through scientific research and practical application we have been able to reveal new controls and methods, otherwise impossible for the average farmer to obtain, all of which has been published in the four editions of the History of Randleigh Farm.

The Kenan Fountain

In March, 1920, I employed Carrere & Hastings, of New York City, to design and erect the Memorial Fountain at Wilmington, N. C. at a total cost of $42,939.92.

The Kenan Stadium

In October, 1926, I employed Atwood & Nash, of McKim, Mead & White to design the Kenan Stadium, which was constructed by T. C. Thompson Contracting Company, at Chapel Hill, N. C., at a total cost of $313,152.76. During May, 1944, I contributed $5,000.00 to make some repairs.

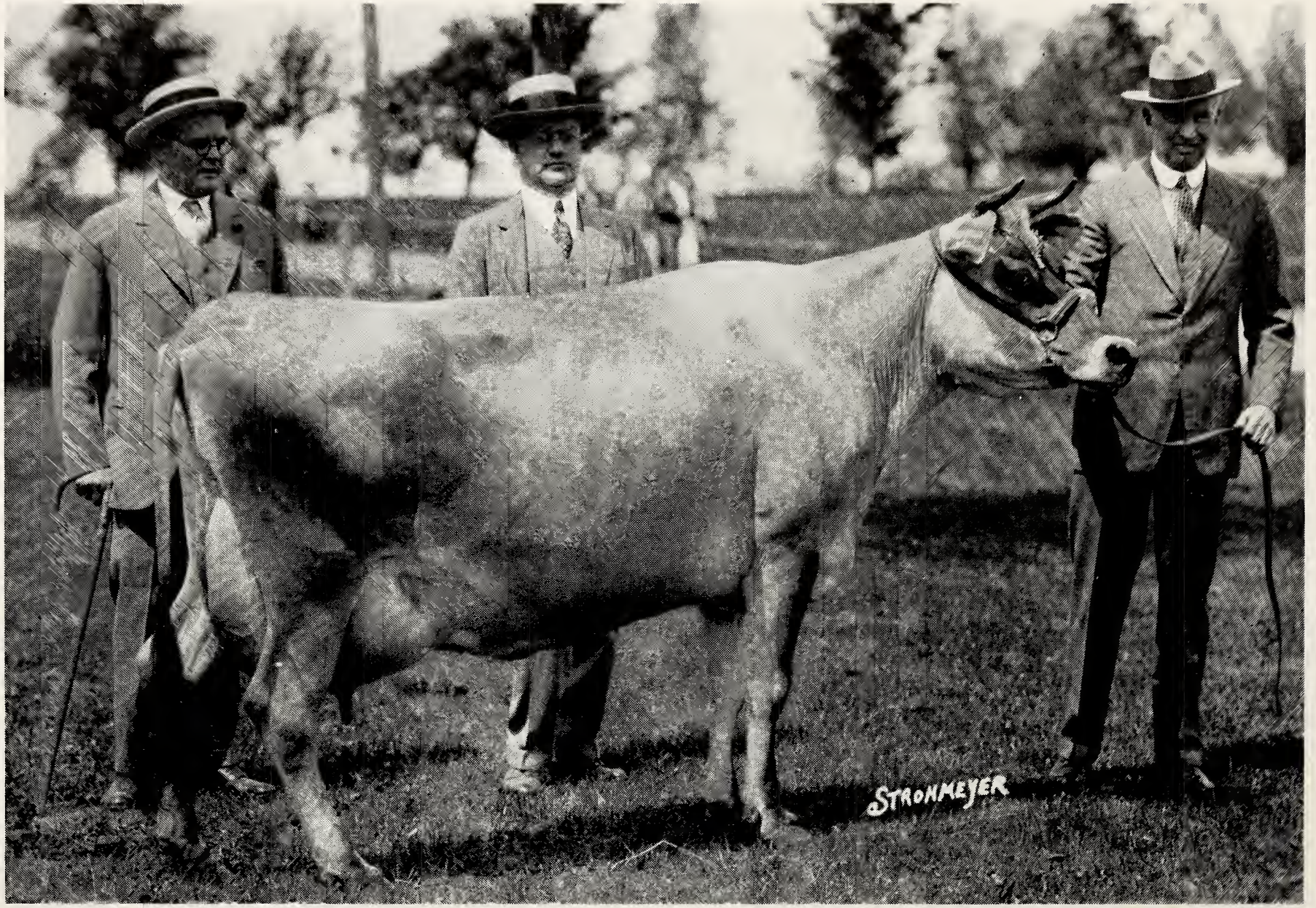
Camp Kenan

The suggestion for providing a Summer Camp for boys came to me through Mr. John Tagg, the genial and competent General Secretary of the Lockport, N. Y. Y.M.C.A. and in March, 1925, I purchased a tract of land comprising seven acres off the shore of Lake Ontario, at Barker, N. Y. (which is about 18 miles northeast of Lockport) at a cost of $15,000.00.

At first tents were provided for the boys, suitable service buildings having been erected of a more permanent nature; a sewage disposal plant approved by the State of New York Health authorities, and an adequate potable water supply obtained from the Village of Barker (after considerable annoyance and expense providing the right-of-way). Additional land has been purchased by me so that the Camp now consists of 25 acres, with frame Headquarters Building, Kitchen and Dining Hall, Hospital and other permanent buildings provided by me at a total cost of $127,812.35, and I believe that the Lockport Y.M.C.A. now has one of the finest Summer Camps to be found anywhere.

It has been a source of great satisfaction to me to see these young fellows develop, not only physically, but in proper habits of life and conduct, while they enjoy these privileges.

When Mr. Tagg first discussed with me the subject of a camp for the Y.M.C.A. I stated very definitely that in my opinion there was no excuse for a camp that could not earn it's operating expenses. Not to make money, but the rates charged should be sufficient to pay it's way and build up a reasonable surplus for a rainy day.



Dairylike Madcap, #646111, 1927

I am happy to say that this has been accomplished although the first few years were operated at a loss, they now have a nice surplus, while the rates are still much lower than any camp of equal facility as far as I know.

Randleigh Farm

I purchased a family cow during 1913 and she happened to be a Jersey. From this beginning I became interested in the breed and during 1921 purchased a farm.

In my "History of Randleigh Farm" I tell of the founding of this farm and it's progress and the cost of the dairy animals in stocking the farm, which amounts to $158,454.00. The cost of the land, buildings and equipment has been more than $300,000.00.

The unique INN, erected in the Fall of 1932, was designed under the guidance of Professor Oscar Erf, of Ohio State University, who has been so resourceful and helpful in the promotion and solution of our many problems, the results of which I sincerely trust may prove of great humanitarian benefit as time goes on.

Our experimental and investigational work at the Farm has been most interesting and helpful and it has been pleasant to have been associated with the many persons who have given so much of their time and ability to carry on this work. Most of all, I wish to express my thanks and appreciation to Professor Oscar Erf, of Ohio State University, who has suggested many of the improvements and actually has been the director of our efforts for more than fifteen years. His never failing interest and his real ability has helped much. Also many others deserve my thanks for their full interest at all times. The following are some of the individuals referred to:

Dr. Ernest Scott	Ohio State University
Dr. Paul C. Kitchin	Ohio State University
Dr. Dorcas	National Carbon Co., Cleveland
Dr. J. F. Lyman	Ohio State University

Biltmore Farm Classification
July, 1944

(Left to right): J. L. Hutcheson, Jr., George Wallis, Dean W. Colvard, Otto Schaefer, Dr. H. W. Odum, Royer H. Brown, R. L. O'Kelly, Herman F. Heep, Glenn P. Kingsley and Wm. R. Kenan, Jr.

Dr. J. F. Cunningham	Ohio State University
Dr. O. L. Inman	Antioch College, Yellow Springs, Ohio
D. G. Perkins	E. R. Squibb & Sons, New York City
Dr. Robert Biltz	E. R. Squibb & Sons, New York City
Dr. George Curtis	Ohio State University
Dr. Francis Phillips	Ohio State University
Dr. F. M. Pottenger, Jr.	Pottenger Sanatorium, Monrovia, Calif.
Dr. H. H. Weiser	Ohio State University
J. G. Katzenberger	Ohio State University
J. P. Dixon	Antioch College, Yellow Springs, Ohio.
Dr. V. M. Albers	Antioch College, Yellow Springs, Ohio.
Dr. P. Rothemund	Antioch College, Yellow Springs, Ohio.
Dr. H. Federichi	Antioch College, Yellow Springs, Ohio.
Dr. Harry V. Knor	Antioch College, Yellow Springs, Ohio.
Dr. A. F. German	Nutritutional Research Assn.
J. F. Wischhusen	Harshaw Chemical Co., Cleveland
Dr. J. F. Emery	Harshaw Chemical Co., Cleveland
Dr. Irene Levis	Case School of Applied Science, Cleveland
Dr. Ernest Lawrence	University of California, Berkeley, Calif.
Dr. Lowell A. Erf	University of California, Berkeley, Calif.
Dr. Charles M. Carpenter	University of Rochester
Dr. Ruth Boak	University of Rochester
E. D. Hildreth	Ohio State University
Dr. Emmerich Von Haam	Ohio State University
Dr. E. F. Almay	Ohio State University
Dr. Ralph Elliott	Ohio State University

and many others.

The Nurses Home

In 1924 Mr. Frederick P. James and myself built the Lockport Hospital Nurses Home on a 50-50 basis, my contribution was $25,654.00. Mrs. Kenan equipped the building at a cost of over $10,000.00.

Lockport, N. Y.
Y.M.C.A. Building

In 1924 I contributed $25,000.00 towards the construction of a new Y.M.C.A. Building in Lockport, N. Y.

Fred E. Rathburn, *Member American Jersey Cattle Club*; Judge J. G. Adams, *President American Jersey Cattle Club*; Herman F. Heep, *Director American Jersey Cattle Club*, and W. R. Kenan, Jr., *Vice President American Jersey Cattle Club*
1944

Wilmington, N. C.
Presbyterian Church

In 1928 my two sisters and myself gave the funds to construct the Chapel and Spire in connection with the First Presbyterian Church, Wilmington, N. C. My contribution was $17,083.00.

June 10, 1914, I gave to The University of North Carolina my Chemical Library consisting of more than 200 books. Also donated for the purchase of more books $8,981.16.

Also have given each year since gift to the Library the Journals of the American Chemical Society.

1926	Hurricane Storm Damage, Florida	$6,325
1928	Radiation Laboratory, University of California	5,000
1940	Historical and Restoration Society, St. Augustine, Fla.	5,000
1940	American Red Cross, Lockport, N. Y.	13,125
1942	University of North Carolina, Carolina Press ..	10,000
1933-45	Ohio State University, Columbus, Ohio	15,275

These are only a few of the more important things that I have accomplished.

	Member	
Town and Country Club	Lockport, N. Y.	1904
University Club	New York City	1906
Tuscarora Club	Lockport, N. Y.	1910
American Jersey Cattle Club	New York City	1920
Bankers Club of America	New York City	1924
National Dairy Association	Chicago, Ill.	1924
National Farm Chermurgic Council	Columbus, Ohio	1937
Newcomen Society	London, England	1939
Elected Honorary Member Rotary Club	Lockport, N. Y.	1943
Country Club of Buffalo	Williamsville, N. Y.	1944
Y.M.C.A. Certificate of Service to Youth	Lockport, N. Y.	1944
University of North Carolina, Honorary Degree, Doctor of Laws	June 5,	1944
Master Breeder Award for 1945 by American Jersey Cattle Club	March 7,	1945

Member of Societies

American Chemical Society		1893
American Institute of Electrical Engineers, Associate member	Jan. 20,	1897
Full member		1901
American Electro Chemical Society		1902

Epilogue

To Mr. Schuyler Beattie I express sincere thanks for services as my amanuensis.

Addenda

Memorabilia Etc.

W. R. Givens, Editor of the Daily Cataract, Niagara Falls, N. Y., was to take a vacation, so he requested each member of the University Club to write an editorial during his absence. The following was my contribution and was published July 28, 1896, in that paper:

THE RISE OF SYNTHETIC CHEMISTRY

Synthetic chemistry, as applied to the production of bodies which were formerly supposed to have their origin only as the result of animal and vegetable life, does not date back more than 75 years. The discovery of Wohler, which led in 1828 to the synthetic production of urea, perhaps marked the beginning of studies in this department of research. Since that time wonderful strides have been made in the domain of chemistry which have already been of much commercial value, as will appear below.

The work of Berthelot, Kekule, Kolbe, Fisher and others has shown many examples of synthetic products, which are furnished at so small an expense as to practically exclude from the market the corresponding natural articles. By surrounding the points of an electric light with hydrogen, the carbon and hydrogen combine to form acetylene. This has a wide range of development, it being said that all aniline dyes can be produced from acetylene.

The slow natural oxidation of the alcohols in fermented and distilled drinks, giving rise to ethers of delicate odor and flavor, is an expensive process; synthetic chemistry has boldly come to the aid of nature, forming a great variety of flavoring matters for food and drink. For instance, the essence of fruits and flowers are now made in great numbers in laboratories and supply to an extent the natural product. The pure fruit flavors of many soda water fountains could easily prove an alibi in respects of orchards. Further still, with the aid of ethyl alcohol, burnt sugar and a collection of artificial essences, the skillful manipulator will mix in short order drinks which resemble bourbon and old rye, maderia and sherry. Not only this can be

accomplished, but according to the great French chemist, Berthelot, tea and coffee could be made artificially if the necessity should arise. As yet, however, no attempt has been made to compute the cost of a single cup of Java synthetically produced.

It is a fact that artificial sugar has been made by the condensation of ethylene, and we think that the time will come when the culture of beet-sugar and cane-sugar will be abandoned since they have already ceased to pay.

The sugar planters of our own country, who during the past season have been making sugar at a cost of four cents per pound and selling it for three, will bear witness to the fact that this happy period has already arrived.

Jean Ercole Pelligrene, a Frenchman, has taken out a patent in this country for making sugar in a thoroughly direct manner, and it may not be amiss to explain the process here. Ethylene gas, carbon dioxide and steam are admitted in proper proportions to a channeled cube of pumice-stone, impregnated with platium sponge. The Co2 and C2 H4 are used in practically equal volumes and the steam ad libitum. The pressure is so regulated that each gas will gradually diffuse through the whole porous, platinized space. The operation is continued for about one half hour, and "at the end of this period," to quote the language of the letters patent, "a syrup containing 25% of sugar is withdrawn.

Few know that chemistry has developed the whole science of cooking and flavoring and provided most of the utensils of the kitchen. It remains now only for it to complete it's work and furnish the food itself. Steps in this direction would eventually be a substitution of the chemist for the farmer.

The beefsteak of the future may not be identical with that of today, but it will be a tablet of any color, shape or size desired, and will entirely satisfy the epicurean senses of the year 2000.

Even granting the fullest development of such a scheme we will be compelled to admit that there is still an immense gulf between the best of the products now formed and human food. In regard to medicines and drugs, however, we think the case more hopeful.

The wonderful progress of science is thoroughly exemplified in our own city by the carborondum, carbide and many other works.

Reprint from The Jersey Bulletin of August 20th, 1944

The following article was written by Mr. J. W. Canada of Houston, Texas, an editor. He was a college mate of mine at the University of North Carolina. Unfortunately I have not seen him since we graduated in June, 1894.

KENAN HONORED BY NORTH CAROLINA UNIVERSITY

Work with His Jerseys the Basis of LLD. Degree Award

"William Rand Kenan, Jr., born in Wilmington of pre-revolutionary Duplin, Wake and Orange County, North Carolina families, B.S., University of North Carolina, assistant in chemistry to that pre-eminent scientist, Francis P. Venable, under whose guidance he shared the identification here of calcium carbide in the discarded matter from an electric furnace at Spray, and in the discovery of the commercial process of making acetylene gas as the foundation of a great modern industry; an engineer, who constructed, equipped and superintended electric and carbide plants in Australia, Germany and many American states; executive director of pulp, sulphite and paper industries, railroads and hotels; benefactor of his home community and institutions, founder and supporter of an annual summer camp for worthy boys, for many of whom he makes possible a college education; owner and director of Randleigh

Farm, an experimental laboratory for the advancement of the science of animal industry and the related values of animal feeds and human foods, whose finest Jerseys have won some 300 medals; an eminent scientist and a generous patron of science without profit to himself, but of wide beneficence to his generation and the generations to come.

"In this most beautiful stadium worthy of the parental name it bears, we would recall to him this evening, as ever his most genial and modest self, his Chapel Hill days as tumbler in the gymnasium, right fielder, right half-back, leader of the University German, as co-worker with Professor Gore in building the first electric light and power plant and as assistant to Professor Venable in the adventurous and generous discovery which became one of the flaming and welding wonders of the modern age.

"By the nomination of the general faculty and the vote of the University Board of Trustees, the University of North Carolina confers upon you the degree of Doctor of Laws."

So reads the citation of William Rand Kenan, Jr., of Randleigh Farm, Lockport, N. Y., as President Frank P. Graham, of the University of North Carolina, conferred upon him the honorary degree of Doctor of Laws, at commencement at Chapel Hill, June 5, 1944.

This degree, the highest that can be given by any great college or university, was in recognition, not of his achievements in the field of chemistry, or as a construction engineer, or a business administrator, or by reason of his great philanthropies, but of his work with his Jersey cattle.

His motto is and always has been: "A Cleaner and Better Milk Supply for Mankind."

Breeding, feeding, sanitation; these three words sum up all there is to the successful dairy business.

Few minds there are that can compass properly all that is inherent in these three words. Mr. Kenan's trained mind could, and he possessed the means whereby known facts and processes could be assembled as a starting point toward a fuller knowledge, and men and material marshalled for study and experiment.

Chance played its part, too. Each cow bought for family use was better than the ones bought previously. In 1920 he went to the sale at Hood Farm, really to buy one more family cow. He bought five cows and a bull. Of course, these were Sophie-Tormentors. He began to be in the dairy business. A farm must be bought and it must be equipped right.

With him from almost the beginning and today, was Mr. T. E. Grow, who had his early training at Hood Farm. Mr. Kenan himself has always shown a rare ability in selecting and judging cows. In this manner the first, breeding, was provided for.

The richness of milk of registered Jerseys has long been fixed. Nor has the average of 10,000 such cows varied many points above or below 5.3 per cent for a century. This cannot be changed by feeding. It was already fixed in the breed.

Feeding, however, does concern the cow, beginning with the unborn calf and carrying through production and reproduction to old age and death. With the foundation laid in his breeding stock, here was a limitless field for imagination and experiment. He took the whole range of dairy feeding for his field. He gathered about him the leaders in this field and they set forth to build upon all known facts.

High-producing cows, such as Mr. Kenan has, cows that respond quickly and in great degree to clinical tests for feed values as affecting both production and constitutents of the milk itself, were at hand.

Prof. Oscar Erf, of Ohio State University, at Columbus, whose studies and experiments with nutrition of dairy cattle

had gone back over almost a third century, was called in and told by Mr. Kenan to go ahead. Through experiment and study he had long since come to know the importance, even the necessity for the "green" in grass and hay, and its effect on both production and reproduction. Every dairyman knows what green grasses and clover and green hay mean to his milk cows.

Mr. Kenan sums it up:

"It is not necessary that elaborate buildings and equipment be bought, but it is essential that the cow be comfortable and contented in her stable and that she be fed the necessary factors —proteins, carbohydrates, fat, minerals, vitamins, green of grass, enzymes, etc., and in proper balance—if she is to attain high production, maintain such a flow over a period of years, and raise a healthy calf every year."

The scientist, Dr. Erf, backed by the scientist, Dr. Kenan, proceeded to carry through regardless of expense, every experiment and every study that could be devised bearing upon the aim, to find out just what it is that makes the good cow give more milk of a better quality, live longer and bring forth a still better calf.

This carried them through the pastures and hay crops, the fertilizations of the fields, the handling of the hays and clovers and alfalfas, the minerals that need to be supplied to the fields, the minerals that should be supplied in measured quantities to the cattle direct in their feed, and the effects of the milk produced upon the white rats, their growth and body structures, even their teeth.

The results of these experiments and studies over many years are evident in the healthfulness of the cattle on this farm, their unusually high productivity, and the character of the milk produced as well as the quantity.

This study and these extended experiments showed conclusively that the best milk from every standpoint for human con-

sumption is the raw milk, as it is called, that is, the milk as it comes direct from the cow and goes direct to the consumer.

Now comes sanitation, as the third step.

Here Mr. Kenan's life training in engineering and mechanical construction stood him in good stead. He planned and had built proper facilities for handling the cows and the calves, even the bulls, so that the best results of breeding and feeding might be attained.

This was not enough. The milk itself must be so handled from the cow's udder to the sealed bottle in such manner that no bacteria, no germs of any sort from any source can find their way into it. He planned and had built the milking parlor, primarily as a safeguard for the milk. But his sound business instinct told him that here, too, is to be found a most valuable adjunct in advertising and selling the milk. Result, all over our nation now, close to the cities, are milking parlors, and milk from such establishments never goes begging for a market.

Carrying it a step further, the milk he had delivered, with no human contact possible, direct into the bottle and cooled to the proper temperature was so kept, till it went into the home of the consumer.

Fortunately, as part of his foresight, in planning for "A Cleaner and Better Milk Supply for Mankind" he has summed up, in volumes issued from time to time, the "History of Randleigh Farm," in reality a handbook for all dairymen who strive for the best in breeding, feeding and sanitation, the three essentials for such milk.

Reprint from The Jersey Bulletin of March 20th, 1945

EDITORIAL

We heartily endorse the action of the American Jersey Cattle Club in conferring the Master Breeder award on William R. Kenan, Jr. The justice of the award is above controversy, for Mr. Kenan has achieved capably, magnificently for the Jersey in his wide range of activities and interest in the breed. He has built up one of the greatest breeding establishments in livestock history, and along with that he has contributed more to experiments in feeding and maintaining a healthy herd, and in the production of superior quality milk than any other private farm establishment of its kind. With men widely known and experienced in research he has conducted experimental work in such things as: Gases in milk and the udder of the cow; feeding (minerals, hydrolized feed, iodine in ration, malting, germinating, dry ice curing of hay and silage); ultra violet rays, mastitis control (sulfa drugs, collodial silver oxide, trypaflavine, agriflavine); grain of grass and grass juice factor; manganese in relation to abortion; produlac trials, curing hay; insulin fortification of milk; comparative feeding tests for Vitamins A, C, G and K; short-wave diathermy treatment for mastitis; microbiology of silage; nutritional fortification of milk; silage experiments; urine analyses; treatment for scours in calves. It reads like the curriculum of a college of dairy science, and is 100 per cent Jersey.

MASTER BREEDER AWARD

Wm. Rand Kenan, Jr., Owner of Randleigh Farm, Is the Second to Be So Honored by A. J. C. C.

Long held in highest esteem by his fellow Jersey breeders, the scientific, dairy, industrial and social advancement worlds, William Rand Kenan, Jr., owner of Randleigh Farm, Lockport, N. Y., director of the American Jersey Cattle Club, has been accorded an honor by that organization which installs him in the new hall of fame of Master Breeders, the second to have this highest of all Jersey awards conferred.

His name is now enrolled there with that of William MacPherson, manager of Pebble Hill Plantation, Thomasville, Ga., upon whom the award was conferred in 1944 as No. 1 in this cherished category.

It is an honor justly bestowed by the American Jersey Cattle Club, for Mr. Kenan's record as a Jersey breeder, and promoter of dairying by virtue of the consecration of his huge plant to scientific research affecting quality milk and human nutrition, is one of the most outstanding contributions in the fields involved.

Mr. Kenan has contributed liberally of his time and ability in American Jersey Cattle Club activities. He has served as director and vice-president of it, and served actively on the committee which piloted proceedings leading up to final action on plans for relocation of the Club offices. He has always proved to be a wise counselor in Club affairs.

Mr. Kenan, a modest man, made a modest beginning with Jerseys when on May 17, 1913 he bought a grade Jersey for a family cow. Quick to appreciate the breed, on July 13 of that same year he bought his first registered Jersey, Peg o' My Heart 294352, an unbred heifer. But it was not until April 15, 1920 that he set out in earnest by buying a real foundation of five

cows and a bull at Hood Farm for $7,300. From that time on he has never hesitated in paying the price for any animal which he considered would fit into his herd and further his plans toward his high goal. He has paid a total of $149,234 for Jerseys that met his requirements, and the list is legion, containing such almost legendary names as Sybil Tessie Lorna, thrice world's champion; Killingly Torono Lass, twice a national champion; Sophie's Emily, 143,348 lbs. milk, 7,030 lbs. fat, five Gold Medals and one Silver; Darling's Jolly Lassie, world's class champion with 1,141 lbs. fat as a 4-year-old, with three Gold Medal daughters, and a Gold Medal son at Randleigh; Dairylike Madcap, two records of over 900 lbs. fat. His most recent acquisition of a jewel was in the Sale of Stars when he bought Biltmore Standard Fairy 1253964 for $4,000.

Randleigh Farm is not only a research laboratory, but is managed with business acumen and has installations of the most modern, sanitary equipment, including milking machines, spotless, durable piping, and other things which number catalog length. Mr. Kenan is a devout Jersey milk evangelist and does everything humanly possible to extend the use of this superior food. His milk is an honest example of what he thinks Jersey milk should be, and the nutrition world regards it as such.

Mr. Kenan believes in the Jersey program in all of its phases, as instituted by the American Jersey Cattle Club. He tests for production, both R. of M. and H. I. R., for health, classifies, produces Creamline Milk, stars bulls and modestly but convincingly apprises the world of what his cattle are achieving. He has never taken time out for the showring, but knows exactly how his herd rates in type as established by use of herd classification. Suffice it to say that the all around record of his herd sells every surplus animal on the farm. Bull calves do not remain there long.

The herd was classified in 1935, 1939, 1941 and 1943.

In the field of testing, the Randleigh Farm herd is a giant.

It has piled up big individual records in the American Jersey Cattle Club files and it dominates its state. In the production of butterfat it holds both junior and senior 2-year-old, senior 3-year-old (a world's record) and senior 4-year-old, 365-day division, and junior and senior 3-year-old (former a world's record) and 5 years and over championships in 305 days.

In milk, 365 days it has the state record in junior 2-, senior 2-, senior 3-year-olds, and over 12 years. In 305 days, junior 3-, senior 3-year-olds, and 5 years and over.

From 1935 to 1941 inclusive, 546 female calves were born on the farm. The yearly crop is yet at about that rate. No cow is ever sold until she has been tested.

These achievements have been possible because careful, scientific study of breeding has been consistently followed. When a better breeding bull is revealed by the records, he is given a green light in the breeding schedule. A Randleigh bull is as near a guarantee of production as human effort can produce. All cows are life-time tested, and careful comparison made of dam-daughter production. All sires used at Randleigh are home bred.

Jerseydom is not the only body to pay Mr. Kenan high honor in many ways. Only last year the University of North Carolina bestowed upon him the degree of Doctor of Laws, as reported in our Aug. 20 issue. That account says:

"This degree, the highest that can be given by any great college or university, is in recognition, not of his achievements in the field of chemistry, or as a construction engineer, or a business administrator, or by reason of his great philanthropies, but of his work with his Jersey cattle."

In all of the other fields mentioned in the above paragraph Mr. Kenan has been equally notable. He is an inventor of note, his inventions including a number of devices in dairy equipment, and he has sought no profit from them, the manufacturing privilege carrying the provision that they reach the dairy

as cheaply as possible. He is an electrical engineer by profession.

Mr. Kenan has for some years been issuing a book, "History of Randleigh Farm," which goes into detail in every phase. It is almost a text book, and, based on Jerseys only, it has proved to be a most valuable contribution to both dairy breeding and dairy science. Each issue is revised and brought up to date historically.

Scientific studies at Randleigh started in 1930 with Ohio State University co-operating. Since then Rockefeller Medical Research Hospital at Baltimore, the Kettering Foundation and Antioch College have been affiliated in the research work on subjects and experiments, fair coverage of which would be voluminous.

Reprint from

PROCEEDINGS

of the

Annual Meeting

AMERICAN JERSEY CATTLE CLUB

324 West 23d Street, New York City

June 6th, 1945

Judge ADAMS: Gentlemen, the next official business is a source of a great deal of pleasure to me personally and I think to all of us because we now proceed to recognize and honor a very distinguished member of The American Jersey Cattle Club. As you know, we created the Master Breeder Award a year ago and probably if we had at the time known the difficulty we would have in awarding this we would have been a little more timid about creating it. When we take the list of distinguished members—members who have served the breed and Club year in and year out so many years—the greatest difficulty is finding out which one is greatest. They are all great and when I say that I could mention four or five men in this room, any one of whom it would be an honor to this Club to recognize with this award, but under the terms of the award we are only permitted to give one a year. The Committee this year spent many hours considering this decision and finally reported to the Board with our good friend and distinguished member, Mr. W. R. Kenan, their choice. (*Applause*)

Mr. Kenan occupies a very distinct place in the Club. I do not suppose there is a man who has devoted as much time and so much of his private fortune to an unselfish effort to develop what he believes to be the best in the breed. We are all familiar with his work. He has written a book with three very interesting supplements that is good reading for any man. I think the most unique thing about him is that he has exploded the old adage

that a "Prophet is not without honor in his own country". As you know, he is a native of North Carolina and has worked for the Jersey breed and the dairy industry generally. In addition to that, he is one of the most outstanding in it. Among other of his outstanding accomplishments is that the University of North Carolina recognized him last year in bestowing a Doctors Degree on him. While I, like all the rest of us, would appreciate having an honorary degree from a University, I believe if I had my choice between the two—with all due respect to our old Alma Mater—I would choose this.

I now present the Master Breeder's Award for 1945 to you Mr. Kenan, with a great deal of pleasure. (*Applause*)

Mr. KENAN: Mr. Chairman: I am very grateful for what the Judge has said and I am most grateful to the Club for honoring me in this connection. It was a great surprise to me. I never felt I had done very much. I was tremendously interested in what I was trying to accomplish. At the beginning it seemed I was all alone—everyone was opposed to my method of procedure. But I have stuck to it and I have had a wonderful time.

Reprint from Union-Sun & Journal, Lockport, N. Y., June 15, 1495

NEW CHAIRMAN OF BOARD IS FORTUNATE CHOICE

The Niagara County National Bank & Trust Co. is fortunate in its choice of William R. Kenan, Jr., as chairman of its board of directors.

Mr. Kenan, industrialist, hotel operator, railroad man, farmer and philanthropist, succeeds the late Wallace I. Keep, a public-spirited Lockport citizen of similar talents and accomplishments.

The new chairman's diversified interest make him well-qualified to head the board. He is president of the Western Block Company of this city; the Florida East Coast Hotel Company and other Flagler interests; owner of Randleigh Farm on Chestnut Ridge, one of the nation's model dairy farms.

As a philanthropist, Mr. Kenan has given generously to numerous civic enterprises, charities and developments.

Perhaps his best known contribution has been his development of Camp Kenan on Lake Ontario, north of Barker, as a boys' Summer camp, directed by the Y.M.C.A.

Camp Kenan, valued at more than $100,000, was established in 1934. It is located on what was formerly the Dr. W. G. Sprague farm, purchased by Mr. Kenan.

Mr. Kenan's herd of Jersey cattle on his Randleigh farm has attracted nation-wide attention and through experimental work conducted under the direction of Prof. Oscar Erf of Ohio State University has done much to improve not only the breed of these cattle but the quality and purity of their product, as well as in finding new means of combating bovine diseases.

The herd began with one cow, purchased before Mr. Kenan knew anything about cows, to supply milk for his family. The choice of a Jersey was accidental, and three years later, in

1916, his "herd" was augmented by the addition of another Jersey, given him by the late Ralph S. Keep.

It was to be still some years before Mr. Kenan began to think seriously of a large dairy herd. His requirements were only of a family nature. But in 1920 he attended a sale at Lowell, Mass., bent on the purchase of one cow and found himself the owner of six and a bull, at a total cost of $7300.

Having now a herd, Mr. Kenan needed a farm, and Randleigh came into being. Purchasing the 350 acres on Chestnut Ridge, he proceeded to improve and enlarge its facilities. Its name was suggested by Mrs. Kenan, Rand, from Mr. Kenan's middle name and leigh, Scotch for pasture or meadow.

The development of this farm has been Mr. Kenan's hobby. New methods of feeding, conducted from year to year with the assistance of numerous leading college agriculturists and firms have been closely watched and widely followed.

The Niagara County National Bank & Trust Co. is fortunate that Mr. Kenan is able to devote time from his other activities to its board of directors.

DISCOVERY AND IDENTIFICATION OF CALCIUM CARBIDE IN THE UNITED STATES

By William R. Kenan, Jr.

During the spring and summer of 1892, while a student at the University of North Carolina, at Chapel Hill, I had been working off and on, with frequent interruptions for classes and other engagements, studying the composition and properties of some aluminum carbide and some hard crystalline mass, which disintegrated and crumbled on exposure to the air and gave rise to a violent evolution of gas when brought in contact with water. This gas was inflammable, burning with a very smoky flame.

Dr. F. P. Venable, Professor in Chemistry, had obtained this mass-matter while on a visit to the little Village of Spray, Rockingham County, N. C., near the junction of the Smith and Dan Rivers, where Major J. Turner Morehead had a cotton mill and a hydroelectric plant with a surplus amount of water. Major Morehead had employed Mr. T. L. Willson to experiment with an electric furnace for a cheap process of making aluminum. Mr. Willson was not making much progress and Dr. Venable was called in as a consultant.

Among other plans tried to liberate aluminum from the oxide, some more positive element like calcium was sought and, in the effort to produce calcium, lime was mixed with tar and other forms of carbon and treated in this furnace, and when cleaning out the furnace, this crystalline mass had been discarded, as there was no very evident mode of utilizing it in the manufacture of aluminum. This dark colored, spongy mass containing a large amount of graphite had been wheeled out on the dump, and when rained on, gave off a small amount of gas with a considerable noxious odor. This is what Dr. Venable had instructed me to investigate and find out of what it was composed.

It was easy to recognize we were dealing with a carbide of calcium. The analyses were satisfactory on account of the

presence of graphite particles and of the partial decomposition of the specimens.

A more important question to settle was the nature of the gas evolved. That it must be a hydrocarbon was a conclusion easily reached and the smoky flame with which it burned pointed to a very large portion of carbon. When the strong smell was taken into consideration the choice among the known gaseous hydrocarbons was very limited. I passed some of this gas through an ammoniacal copper solution and immediately a copious precipitate was produced which was recognized without difficulty as copper acetylide.

With this comparatively cheap and convenient method of making acetylene in any desired quantities and the possibility of its use as an illuminant, the first thought was to overcome the smokiness by mixing with a large proportion of air. On trying a mixture of one part acetylene with four or five parts of air, using an ordinary bat-wing burner, the wonderful brilliance and beauty of this really remarkable light were revealed for the first time in the country, in the late Fall of 1892.

The carbide, when treated with water, was found to yield from 3.2 to 3.7 cu. ft. of gas per pound. Photometric measures were made and, after one sharp explosion of the mixture with air, experiments were made for some better way of burning it. These experiments were in the direction of either a neutral gas as a dilutent or the use of the acetylene alone with improved burners. The generators were of the simplest description and ordinary tin gasometers were used for storage. A little care and watchfulness prevented any repetition of the explosion experience. The range of a mixture with air that did not explode was rather limited. These experiments were carried on during the Spring and Summer of 1893.

When our figures were checked and facts recorded, Dr. Venable invited Major Morehead and Mr. Willson to Chapel Hill, Mr. Walker and Mr. Willson came March 27, 1893, where they witnessed the light and were informed of our discovery that

acetylene was the gas evolved from the waste product of their furnace. At that time I presented Mr. Willson with my note book covering the work done.

After a full discussion of the matter they were to apply for a patent, Dr. Venable was to receive a royalty and I was to have a job. But Willson applied for the patent in his own name and sold the rights covering different Districts of the United States. The first unit to start operation (1895) was a syndicate formed in Philadelphia, under the name Carbide Manufacturing Company, Samuel L. Kent, president; Joseph P. Devine, vice-president and treasurer. In the early part of 1896 the name was changed to Acetylene Light, Heat and Power Company.

Mr. T. L. Willson retained the rights for Canada.

The Philadelphia Company, having obtained certain district rights for the United States, began construction in the Fall of 1895, on the first plant at Niagara Falls. Mr. Samuel L. Kent, the president of the company, wrote me offering me a position. His letter follows:

Philadelphia, December 4th, 1895.

Mr. William R. Kenan, Jr.,
Chapel Hill, N. C.

Dear Sir:

We will have occasion about the first of January next to acquire the services of a man to do our Chemical and Clerical work and to take charge of one shift of our plant for the manufacture of Calcium Carbide now being installed at Niagara Falls. You have been recommended to us by Mr. J. M. Morehead and we write to ascertain if you are in a position to accept such a position as we have to offer, to let you know what will be expected and to make you an offer for the situation.

In the event of your forming a connection with our company you will have entire charge of the Laboratory and of the office at all times. We will expect you to work ten hours a day, seven days a week. During six hours of this

time you will have charge of the plant and of all men at work at such time. During the rest of the ten hours we will expect you to make tests of the Carbide from each charge of the furnace and to make an occasional determination of the Lime in the furnace mixtures. There will also be submitted to you for analysis samples of lime and of coke. We will expect you also to keep the time of the other men, to make out the pay rolls and to attend to the correspondence and the shipments of the carbide and the receipts of lime and coke. The electrical apparatus will be delivered at Niagara about the 26th of December. If you decide to accept the situation we will want you to report for work at Niagara Falls on Wednesday the 1st of January and assist in the erection and installation of the electrical equipment and of the wiring of the building for lights, etc., under the supervision of the Engineer of the Company furnishing the electrical apparatus and of the Engineer of this Company.

You will probably be associated with Mr. Jesse C. King of North Carolina and Mr. Edgar F. Price, formerly of that state, now of Newark, N. J., who will have charge of the Mechanical and Electrical Equipments respectively and of the other two watches. We will pay you twenty-five dollars ($25.00) per week.

Kindly advise me, care Carbide Manufacturing Co., Bullitt Building, Philadelphia, Penn., as soon as you have arrived at some conclusion on the matter.

Very truly yours,

Dictated. Carbide Manufacturing Co.,

(Signed) SAMUEL L. KENT.

This offer may seem amusing to many in this day and age, but I accepted it with alacrity. It looked to me like an unusual opportunity, and I was only too happy to receive the appointment with Jesse C. King and Edgar F. Price, to construct, and to operate the first plant of this new company.

The first furnaces were constructed of common brick lined with fire brick, having an interior dimension of 3½ feet x 4

feet x 7 feet high, and were supposed to consume 250 horsepower each. These were similar to the ones used at Spray, N. C., except that they were larger in area and consumed more power. In the Niagara installation a cast-iron pot on a truck was used inside the brick furnace, the area of the pot being about seven inches each dimension larger than the total area of the carbon pencil used. These furnaces required about two weeks to build but only lasted a few hours when the intense heat melted the brick and it would flow like molten iron. This situation required some improvement and, while the cast-iron pot helped the situation, it was not sufficient. From this experience with the cast-iron pot, however, came the satisfactory use of the raw mixture to insulate the molten carbide from the furnace walls. This was first accomplished in the Horry Rotary Furnace, both at Niagara Falls and Sault Ste Marie, Mich. The first carbon holder was made of cast-iron, the electrode being 4 inches x 4 inches x 36 inches long. Twelve pieces were used in a cast-iron holder and held in by set screws. A great deal of difficulty was experienced in holding the pencils since the heated holder would continue to expand. That was overcome by water-jacketing the holder. It is interesting to note that during the first six months of operation at Niagara Falls, the cost averaged $100.00 per ton, while our selling price remained at $75.00 per ton. Of course this kind of operation was unsound economically, and I dare say that if other persons could be found to do this work, we would have been discharged, but the fact remained that we were practically the only persons who knew anything about calcium carbide and it was necessary that we be kept working. Eventually, of course, improvement in the methods of producing calcium carbide was made, and the cost reduced.

Mr. John Motley Morehead, son of Major Morehead, was employed as consultant by his father, and has been continued more or less in that capacity since.

During 1895 and 1896 the Electro Gas Company was formed for the purpose of selling District Rights to manufacture. This

was a promotion and stock jobbing enterprise. In addition to the Acetylene Light, Heat and Power Company, Niagara Falls, N. Y., Willson Aluminum Company, Holcomb Rock, Va., the following purchased District Rights: Pettibone-Mulligan Company, Appleton, Wis., and Lake Superior Carbide Company, Sault Ste Marie, Mich. This latter company was owned and operated by the Peoples Gas, Light and Coke Company, Chicago, Ill., who owned the Rights for Cook County, Ill.

I was located at Niagara Falls, as Chemical Superintendent, also at Appleton, Wis., and Sault Ste Marie, Mich., as Superintendent.

During the Summer and Fall of 1896, Mr. George O. Knapp, the chief engineer of the Peoples Gas, Light and Coke Company, Chicago, became much interested in the manufacture of carbide and made several visits to the plant at Niagara Falls. Some time later in 1898 he, together with Mr. C. K. G. Billings, of the Peoples Gas, Light and Coke Company, Chicago, together with Mr. Dieterick and Mr. Prowle of the Consolidated Gas Company of New York City, formed a syndicate and bought out the Philadelphia interest. Several years was consumed in absorbing other small plants that had been licensed by Willson, when these individuals above-mentioned, formed the Union Carbide Company, Incorporated, March 30, 1898, in Virginia.

So from the discard of the little furnace at Spray came a process for making gas that was destined to flame-cut the metals of the world and then weld them into the more desirable shape as required by man.

(Signed) WILLIAM R. KENAN, JR.

Lockport, N. Y., February, 1939.

A CONCISE DESCRIPTION OF THE ELECTRICAL APPARATUS EMPLOYED AT THE SAULT STE. MARIE WORKS OF THE UNION CARBIDE COMPANY

By William R. Kenan, Jr., *Superintendent*
(1898-1899)

The generating station is located on the Canadian side of the St. Mary's River in the Power House of the Lake Superior Power Company.

Mechanical power is leased from the above-named company, it being developed by means of water.

The station consists of one Fort Wayne 400 K.W. 2200 volt composite wound alternator 133 cycle, 467 R.P.M.

From the above one would readily see that this is a standard type lighting machine. After experiencing much trouble, due to the field grounding, the writer cut off the Rectifier and used both the high and low tension field windings in series for the exciting current. No more trouble was experienced after the high voltage was taken off of the field windings.

Three alternators of 250 K.W. capacity and 125 cycle at 700 R.P.M. were constructed by this company, on the spot, after the designs of one of our engineers, Mr. W. S. Horry. They are distinctly a Ferranti type except that there are two generators combined, each having an overhanging armature. That is, an armature is on each end of the shaft, the driving pulley being in the center. Each armature generates a potential of 1100 volts and since they are connected in series, a 2200 volt pressure is maintained. Each alternator requires an exciting current of 65 amperes at 110 volts, and all three are excited by means of a shunt wound Edison Bipolar. The transmission line is about 10,000 feet in length and consists of eight separate conductors, each being a 2/0 bare stranded cable of 19 wires. Six of the conductors are used in connection with the three Horry alternators, the same being operated in parallel. The

remaining two are utilized in connection with the Fort Wayne. This arrangement was necessary because of the fact that we gradually increased our Carbide Plant from 250 H.P. to 1,000 H.P.

From actual tests made by the writer the drop in the line was found to be 19.4% while the loss was 10.8%. That is when delivering 1,000 horsepower on the six conductors. The transmission line fed into four Westinghouse oil cool static transformers of 250 K.W. each. Three of these were connected in parallel to take care of the 750 K.W. delivered by the three Horry alternators. The ratio of these transformers is 20 to 1. Five Rotary Furnaces of 250 H.P. capacity each, were connected in parallel with the three transformers, four being operated at all times.

The single transformer fed two furnaces, these being in parallel. Generally only one is operated, but when experimenting both are run with a load of 125 K.W. each.

In order to obtain the proper voltage in the furnaces it was necessary to maintain a difference of potential of 2300 volts at the generator end of the line.

The plant is by no means an ideal one, for the reason that it was constructed in stages. However, the results obtained are most satisfactory and have not to this day been improved upon. No contract was let for any complete part of the electrical equipment, except in the case of the transformers and the Wood Alternator, both of which we installed. In every case the material was purchased and constructed in accordance with our own design.

The following article was written at the request of the German Acetylene Company of Berlin and was used by them in that country. It has never been published in the U. S. A.

The writer felt that those now connected with the manufacture of carbide would be interested in comparing the great advancement in manufacturing processes taken place during the past 38 years.

SOME INTERESTING FACTS RELATIVE TO CALCIUM CARBIDE AND THE PROCESS OF MANUFACTURE

Calcium Carbide is produced by smelting together in an Electric Furnace, finely divided and intimately mixed lime and coke. Any form of carbon will answer to make Calcium Carbide, dust of hard or soft coal, charcoal, or even sawdust can be used but the production of the furnace per horsepower of energy consumed is very much greater with coke dust than with any of the other forms mentioned. The dust of soft coal intumesces, i.e., it swells up when subjected to the heat and forms a tarry mass in the furnace which gathers around the carbon pencils and shunts the current away from the Arc by conducting it around the air gap directly to the bed plate or bottom of crucible; there is too, a production of a large quantity of gas as the coal is burned which carries mechanically the finely pulverized lime out of the furnace. Hard coal is subject to the same objection but in a smaller degree. Charcoal burns up and leaves the lime. Over the surfaces where the mass of the mixed material is exposed to the air, the charcoal catches fire and smoulders until all the surface for an inch in depth is covered with white lime, the carbon being entirely consumed by combination with the oxygen of the air. The furnace production is considerably lower for charcoal than for coke, the quality of the carbide produced, however, is all that could be desired. Some form of furnace from which the air is excluded might be devised in which this form of carbon could be used to advantage and especially is this true when in the form of bricquettes. Almost any form of coke containing a low percent of ash—12% or under—can be used. The quality of being "Burden Bearing," so essential in all coke

for blast furnace use, is of no importance in coke for Carbide making, as it is all reduced to a fine powder before being used. It is better to purchase good coke in large pieces and crush it, than to attempt to use the "breeze" or screenings from the coke ovens, as this always contains a large percent of Silica and other foreign matter, raked up from the ground, which lower the efficiency of the furnace and the quality of the Carbide. Good coke should not contain more than 6 to 8 percent of ash.

For the other constituent for making Carbide, ordinary builders lime is best adapted. Limestone, marble or unburned shells can be used but this amounts to burning them to lime in the furnace, just as the use of coal dust means coking the coal in the furnace and then using the lime and coke produced there for the production of the Carbide. When lime is burned 56% is quick-lime, the rest being lost in the form of Carbon Dioxide Co2, and as electricity is an expensive form of energy and a costly mode of obtaining heat, it is best to carry on these operations outside of the furnace with heat obtained more economically from burning wood or coal direct. These statements are based upon results obtained by the writer when utilizing Limestone instead of Lime. One particular test produced Carbide of good quality, the average gas being 5.10 cu. ft. per lb. The production, however, was only 3.36 lbs. per H.P. per day. In this case the use of the Carbonate instead of the oxide of lime increased the cost of the Carbide $5.96 per ton. The lime should be well burned, at least 95% pure, and free from Magnesia. More than 2½% ought to be avoided. That Magnesia has such a bad influence upon the formation of Carbide, is probably due to its low melting point, (1200°F. as compared to Calcium 2000°F.) forming a veil between the carbon and the lime particles, preventing their combination. Magnesia does not unite with either lime or carbon—this latter fact was first shown by Moissan and my own experiments fully confirm his results. The lime can be used either quick, slaked or unslaked.

If slaked, the water added has to be driven off again by the heat of the furnace which lowers its efficiency, and too, almost twice the volume of gases which have to be gotten rid of, are produced in the furnace; lime increases to two and a half times its volume upon being slaked, which necessitates more storage room, but on the other hand, no crushing of the lime is necessary if it is slaked,—it is quite a good deal better conductor of electricity and is not so corrosive in its action on the belts and machinery or on the faces and hands of the operatives. The use of slaked lime, however, is not recommended. The importance of reducing the coke to a powder and of thoroughly and intimately mixing it with the lime cannot be overestimated. If not thoroughly mixed or ground sufficiently fine, the lime will combine with the carbon of the pencil and the coke will be reduced to graphite in the furnace, being heated above the temperature, necessary for combination. Carbon in this state does not readily combine with the calcium but makes its appearance in small shiny scales in the lime and water residue after the Acetylene has been evolved from the Carbide. If the Carbide, after being formed, is still retained in the arc, the same is broken up. The Carbon forming graphite and the lime which is volatilized generally condenses in a pocket, coating the interior. When the temperature of this graphite is reduced to that point necessary for combination it would recombine with the lime. Such is not the case, however, due to the absence of the lime by volatilization. If much silica is present, under the above conditions, it will also be volatilized and shows itself in the form of mineral wool. The coke should be reduced so as to go through a 50-mesh sieve. The lime need not be so finely subdivided but it must be thoroughly mixed. If the lime is ground too much it is difficult to handle, it packs like flour, will bridge in the conduits and does not feed freely into the arc.

To produce 100 pounds of Calcium Carbide, 143.75 pounds of material must be used. This consists of 87.5 pounds of lime and 56.25 pounds of coke. Lime is composed of 28.56% Oxygen and 71.44% Calcium. The 87.5 pounds of lime added

contains therefore 25 pounds of Oxygen and 62.5 pounds of Calcium. The 25 pounds of Oxygen contained in the lime must be eliminated before the calcium is free to combine with the carbon to form Carbide. For this purpose a portion of the carbon added must be used; the oxygen of the lime and this portion of the carbon pass out of the furnace by way of the flue as Monoxide of Carbon—Co—which is burned to Dioxide of Carbon—Co2—immediately after it strikes the air. As the oxygen for the second and further burning comes from the air we are not interested in it. To supply the carbon for the oxygen of the lime to combine with, in place of the calcium with which it was originally combined, so that the calcium may be free to combine with the remainder of the carbon to form Carbide, 33 1-3% of the carbon added or 18.75 pounds of the original 56.25 pounds must be given over. 143.75 pounds of material will produce 100 pounds of Carbide composed of 62.5 lbs. or percent of Calcium and 37.5 pounds or percent of carbon—and 43.69 pounds or 589.82 cubic feet of monoxide of Carbon which is eventually converted into 68.63 lbs. or 590.21 cubic feet of Dioxide of Carbon and it is a useless by-product which must be gotten rid of. 100 pounds of material will produce 69.57 pounds or percent of carbide and 30.38 pounds or percent or 410.13 cubic feet of Monoxide of Carbon. 100 pounds of lime would require 64.27 pounds of coke and would produce 114.27 pounds of Carbide and 50 lbs. or 675.08 cubic feet of Monoxide. These figures are based on the assumption that the materials used are chemically pure and that no loss occurs in the furnace. As a matter of fact, the coke contains on an average 8% of ash and 2% of moisture and the lime about the same percent of impurities, composed principally of moisture taken up from the air, and more or less iron, alumina, silica and magnesia. Some of the lime is volatilized in the furnace and quite a percent of it is carried mechanically out of the furnace by the escaping Monoxide of Carbon. This, however, is recovered and used again. As it is impossible to exclude all the air from the furnaces some of the Carbon will combine directly with the

Oxygen of the air and go off. There is, too, the losses in handling which are incident and unavoidable in all industrial processes. The most economical proportion of lime and coke has been found by practice to be 70 pounds of coke to 100 pounds of unslaked lime. If the lime is to be used slaked, it should be weighed before the water is added or an allowance of about 28 percent should be made for the weight of the water taken up. Chemically Pure Lime increases 32 percent in weight and about two and one-half times in volume upon being slaked; ordinary commercial builder's lime such as is used in the process under discussion increases from 25 to 30 percent acording to purity. Pure material contains 69.57% of its weight of Carbide, allowing for 17% impurities in the constituents this would be reduced to 57.75%. In practice 65% of the possible carbide is saved, this will make, as the process is now carried on, 37.54% of the commercial mixture fed into the furnace come out as carbide. The rest goes up the flue. The 35% loss in the furnace can be decreased.

The mixing is done by means of a Mechanical Mixer of five tons capacity. The lime and coke is weighed separately in a hopper scale, in order to obtain the correct proportions, then dumped into the mixer. 15 minutes suffice to give these a most thorough and intimate mixing when the mixer is discharged and the material is conveyed either to the storage bins or to a bin over the furnace direct.

The furnaces are made of common brick, having a fire-brick lining. They have an interior dimension of 3½ feet x 4 feet x 7 feet high. A truck carrying a steel crucible having renewable sides is placed in the furnace, contact being made to crucible by a clamp on the back. This makes the pot one electrode. The other electrode is suspended vertically into the furnace and consists of 12—4 inches x 4 inches x 36 inches carbon plugs fastened into a cast-iron holder. The carbon-holder is attached to a rod composed of three pieces. The middle one being a copper bar 6 inches x 1 inch and the other two a 6-inch channel.

This rod extends up through the top of furnace and is suspended by means of a steel cable. Flexible copper leads are fastened to a terminal on end of rod, which allows the electrode motion in a vertical direction.

Having the material ready and the furnace connected, a shovelful of loose carbon is placed in the bottom of the crucible to protect it from the intense heat of the arc until a layer of Carbide can be formed under the pencil. The carbon pencil is then lowered until it touches the loose carbon on the bottom of the crucible. A flow of current takes place immediately. The carbon pencil is then raised until there is a space of an inch or more between the lower end of the pencil and the carbon on the bottom of the crucible. The flow of the current is not interrupted by the imposing of this air-gap from the lower end of the pencil to the bed plate; this passage of the current across the air-gap is the Arc. The shute leading from the bin to the furnace is then opened and the material is allowed to flow in until the crucible is quite full. The Arc at the lower end of the pencil and the pencils themselves should be covered to a depth of two or more feet with the material to be reduced. It is necessary to stoke from time to time, for the gases which are formed in the Arc constantly make channels through the material; and especially if unslaked lime is used, these channels will not fall in, and less material will therefore come in to the arc. When the furnace is first started there is great likelihood of the arc's being broken, in which event all load is removed from the machinery furnishing the current which causes the engine or other prime mover, unless provided with a very quick acting governor, to race. When the arc is broken the pencil is lowered again until it touches the bottom of the crucible and another arc established as in the first instance. After the bottom of the pencils gets burned off even and the furnace hot and a layer of carbide produced, there is very little danger of losing the load, but at first this is sure to occur from 2 to 20 times whenever a cold furnace is started with a set of new pencils. All care should be

taken not to interrupt the action of the furnace after it is once started and the bottom of the crucible covered with carbide; because, if the flow of current is stopped for as much as 15 minutes and the mass of carbide becomes chilled it is quite impossible to start another arc on the top of it. In the event of this happening the furnace has to be cleaned out and a new start taken. A stop of 3 to 5 minutes will not matter. As soon as the material gets into the arc the production of carbide begins. The Carbide forms under the pencils and tends to close up the air-gap and to short circuit the furnace. As the air-gap is shortened the Amperage goes up and is noticed on the ammeter. The attendant at the carbon raising device in the switch room then raises the carbon pencil by means of the hand wheel until the Amperage goes back to the proper amount. This adjustment must be made every few minutes, one man can attend to eight furnaces. The carbide forms under the pencil and stands up in a column on the bottom of the crucible and reaches to the lower end of the pencil. The arc is maintained between the lower end of the pencil and the top of the carbide. After the furnace has been working for four to six hours (average power being 200 K.W.—2000 amperes and 100 volts) the mass of carbide in the furnace will be 3½ to 4½ feet high. As the arc is on the top of this and all of the current has to be forced through this mass of carbide, entailing a considerable loss of voltage, it is best to stop after a run of this length of time and draw the charge and start over with an empty crucible. The Carbide is always found in one piece resting on the bed plate, or bottom of crucible. It has a conical form, being broader at the base. It, however, never has so great a diameter as to fill up the whole capacity of the furnace, but is generally surrounded by the mixture of Lime and Coke, generally 3 to 4 inches thick. This mixture is so poor a conductor of heat that it thoroughly protects the iron crucibles. It is very easy to separate the carbide from the loose material, for the latter never melts together. When it is desired to arrest the process for any cause, the pencil is raised until the arc is broken, no further flow of current or

action of any kind takes place until the pencil is lowered again and touched the carbide or the bottom of the crucible and withdrawn. After the crucible and carbide is withdrawn from the furnace it can either be dumped out of the crucible and left to cool or it can be left to cool in the crucible. A six-hour run will require from 2½ to 4 days to become perfectly cold. It is best to allow the Carbide to partially cool in the crucible requiring about four hours; if it is exposed to the air the Carbon burns out very rapidly for an inch over all the surface. Allowing the carbide to cool in the crucible necessitates the use of a great many more crucibles than would be necessary if the Carbide was allowed to cool in the air, but it is cheaper to have these than to lose the product by oxidation of the surfaces.

The same method is employed wherever Carbide is being produced commercially, and no radical change is to be looked for. The apparatus, however, has been greatly improved and along this line will come the better results and therefore a decrease in the cost of the product.

As far as I have been able to judge from my personal experience, the American Manufacturers are far ahead of all others, and their success has been due entirely to the apparatus employed. Much money and labor has been expended on experimental work of a strictly scientific nature. It is of interest to note that in Germany, England and Canada the apparatus and method of procedure which I have described above is still in vogue. In America, we have passed through the era of brick furnaces and steel pots; having discarded them for a continuous Rotary Furnace. The reason for this step forward is quite apparent, even in the furnaces per se. However, it may not be amiss to give some comparative features regarding each.

Selecting as a unit a furnace capable of consuming an average of 250 H.P., we find:—

First:—The cost of the brick type, with necessary steel pots, amounts to $1,500.00, while the Rotary type costs only $300.00, approximately.

Second:—The cost of repairs to the brick type is very large, in some instances as much as $500.00 per month, while that of the Rotary is practically Nil. The depreciation necessarily will be in about the same proportion.

Third:—Of course the brick type is distinctly an intermittant furnace and is not capable of being removed, while the Rotary is continuous (except when renewing the Carbon pencils which occurs once in ten days) and can easily be dismantled and set up again.

Fourth:—The brick type will produce on an average of 1,500 lbs. per 24 hours. The Rotary will produce 2,000 lbs. during the same period. This gives a production of 6 and 8 lbs. per H.P. day, respectively.

Fifth:—The average quality of the carbide made with the Rotary type is much superior to that made with the brick furnace. This is the strongest point in favor of the Rotary.

It is absolutely impossible to produce a homogeneous pig of carbide with the brick type. There will be some first grade product, as good quality as can be produced, but along with it a lot of poor grade carbide which will greatly lower the average of the whole pig.

The explanation is as follows:—Upon starting the furnace, good carbide is produced, but since it is necessary to continue pumping the current through that Carbide it is heated to a temperature at which disintegration takes place and a portion of the Carbide is destroyed; the lime volatizing and the carbon forming Graphite, a partially stable body. Of course this lowers the quality of the bottom of each pig. Or as is commonly expressed, the Carbide is "baked too much." It is a fact that near the end of the run and possibly the middle of each pig, if the mixture is right, a very superior grade of Carbide is produced.

The disadvantages of the brick type may be summed up as follows:—First cost, depreciation, low production, product unequal,—lumps of pure carbide very rich in gas, but mingled

with masses of overfused lime and coke. The large amount of waste due to frequent stoppages, forming scale and coke-heads, or more properly speaking unfused and partially fused material. This occurs once in every five or six hours.

Now with the Rotary type, as soon as the mixture is heated to that temperature necessary for combination and the carbide is formed, it is dropped out of circuit and more produced. At the same time utilizing all of the escaping heat, in the form of gases, to warm up the cold mixture which next comes into the Arcs.

The Rotary Furnace consists of a large cast-iron pulley having ribbed side plates bolted to the two outside edges and at right angles to its face. Connecting the side plates, or more properly speaking, the peripheries of the furnace, are end plates 7 inches wide. These are clamped on so as to be attached or removed at will. This portion of the furnace forms a box, the inside dimension being 26 inches x 26 inches, and serves to hold the mixture and the Carbide.

The pulley is keyed on a 5-inch shaft, which can be rotated slowly by suitable gears. The shaft is supported by two rigid A frames, each carrying a babbitted pillow block. The furnace requires no special foundation, but can be set on any floor sufficiently strong to sustain its weight, about 10,000 lbs. No part of the furnace, which is entirely of cast iron, is charged electrically, or forms any part of the circuit, it being thoroughly insulated from the electrodes by means of the mixture which completely lines the same. Its diameter is nine feet, although it stands somewhat higher, having a 6-inch clearance underneath.

A hood with stack attached is suspended over the furnace and carries a damper on the back, which extends down to the drum. This catches all of the dust that may be blown out of the furnaces.

Each electrode, for there are two, is composed of four 4 inch x 4 inch x 24 inch carbons, giving a cross section of 4 inches x

16 inches. They are suspended vertically, in a fixed position, side by side, and are separated from each other by 11 inches. This allows a clearance of 3½ inches between the electrode and the cast-iron side plates, and of course more clearance between drum and end plates. The lower ends of the electrodes touch an imaginary line drawn horizontally 2½ inches below the axis of the furnace. The carbon pencils are bolted to a cast-iron holder which in turn is bolted to the copper leads. These bars project up through the hood. The furnace can be operated Manomatically by means of a capstan and lever, or automatically by means of a spur wheel and two pauls, the pauls being influenced electrically when the amperes in the furnace increase or decrease.

The operation of the furnace is very simple, any laborer being capable of accomplishing same. There are two arcs in series, the current passing from one electrode to the other through the top of the pig of carbide. The heat due to the resistance of the mixture is developed between these two points, fusing the lime and coke and producing a puddle of molten carbide. This of course lowers the resistance of the furnace and consequently increases the current, which causes the furnace to slowly rotate and by this movement the carbide is lowered away from the electrodes and out of the circuit, when fresh material is brought between them to be acted on in a like manner.

If any carbide is in the furnace the mixture is shovelled off and the furnace turned up until both sets of pencils touch the carbide. Immediately there is a flow of current through that portion of the carbide between the pencils. Mixture is gradually fed in from the bin above, until the pencils are covered to a depth of about 20 inches. When the furnace is empty it is partially filled with mixture and the arcs drawn by means of a piece of coke placed on top of the mixture. As the furnace rotates, end plates are clamped on the front to keep in the mixture, these being removed from the back. The rotation is

very slight but occurs every few minutes, especially is this important in order to line the furnace with a layer of cold mixture, packing it down between the electrodes and the furnace, which protects the cast iron from the molten Carbide. The mixture sometimes packs and arches over in the center of the furnace, causing channels to be made for the gases liberated. These must be broken down in order that the furnace have appearance of boiling. A good indication of proper operation.

The carbide gradually cools and crystallizes within the furnace, and is extracted comparatively cold from the rear, after the end plates have been removed. It is crushed and packed after six hours further cooling on the floor. The size of the pig formed is about 20 inches x 20 inches in cross section, solid to the core, and extends half way around the hub of the furnace. It ordinarily weighs about 1,800 lbs. gross, but frequently as much as 3,000 lbs. This carbide is of a very high grade and all parts of the pig absolutely homogeneous. The scale, caused by the impurities in the raw materials, is very thin and always on the outside. It averages about 15% of the gross weight of the pig. There is no "Coke head" or spongy mass on top of the carbide for the reason that the process is continuous.

The furnace will produce about 2,200 lbs. of clean packed carbide per day of 24 hours, all showing 5.15 (and over) cubic feet of gas per lb. The furnace consumes 200 K.W., which is 2,000 amperes at 100 volts.

From thermo-chemical data we reach by calculation, that the theoretical amount of power required to generate the heat necessary to produce one pound of carbide is 2.02 H.P. hours. In actual practice, however, 3 H.P. hours are required; the excess of energy consumed being lost in the following manner:

First:—Radiation. This is incident in all processes where heat is generated and cannot be entirely avoided.

Second:—Escaping Gases. Twenty-eight percent of the lime is oxygen and combining with 33 1/3% of the total carbon, pro-

duces 43.69 lbs. of Carbon Monoxide. This not only consumes energy in being liberated from the metal, but carries a large amount, in the form of heat, out of the furnace.

Third:—The Red Hot Carbide. Here an immense amount of heat is stored up and quite an amount is lost by cooling. To illustrate—Take 1 lb. of water at 212°F. and add to it 1 lb. of ice. The result is 2 lbs. of water at 32°F. All the heat being taken up in melting the ice. Now when the two pounds of water at 32°F. is frozen, it will give off the heat necessary to bring 1 lb. of water up to 212°F.

This is also true in the case of a carbide furnace. When all conditions are favorable, the total heat is stored in the carbide; the furnace operating very smoothly and this heat is liberated when water is added to generate the gas.

My experience has led me to believe that it is impossible with the present methods to produce on a commercial scale more than 42 cubic feet of gas per H.P. day. As has been previously stated, the production averages 8 lbs., which on the above basis, would produce Carbide containing 5.25 cubic feet of gas. If the production is increased, possibly to 10 lbs., the quality of the product is lowered in the same proportion. Or vice versa, the quality can be increased certainly to as much as 5.65 cubic feet of gas, while necessarily the production is very low. The above is accomplished very easily. An excess of coke produces high quality but low production, while an excess of lime, and in fact the entire absence of coke, will make a large number of pounds, but of very low grade. In the case of the entire absence of coke, the carbon necessary for combination with calcium to form carbide is secured from the carbon pencils.

It is possible to determine during the operation of the furnace just what grade of carbide it is producing. This comes, however, only after much experience, since so many conditions come into play. The mixture, of course, has a most decided effect, the amount of power used and the voltage also, while to some extent the manner in which the furnace is handled. We

know from experience that when the furnace is operating satisfactorily and producing first grade product, the rate of rotation will be one end plate in about 1¼ hours or 5 inches to 6 inches per hour. Also that an excess of coke increases this rate of rotation while an insufficient amount decreases it.

A Rotary furnace consuming 200 K.W. requires about 400 lbs. of mixture per furnace hour. Of this amount 250 lbs., practically, is converted into Carbide, producing about 91 lbs.; the remaining 150 lbs. being utilized in lining the furnace, protecting the same from the heat. After the carbide is drawn, this unused material is conveyed back to the grinding plant, where more coke is added before feeding it again into the furnace. This is necessary for the reason that from 6 to 8 percent of the coke in this "return mixture", as it is termed, has been burnt out while in the furnace. From the above figures it will be readily seen that 2¾ tons of mixture is consumed in producing one ton of carbide.

If the materials are coarse, the grinding and mixing is easily accomplished, but the bad results are seen immediately upon feeding the mixture into the furnace. The furnace becomes very wild, the load variable, and much blowing is seen, caused by the rapid evolution of the gases, which throws out a considerable amount of partially fused mixture. This necessitates stoking almost continuously.

With fine material the furnace is absolutely steady and can be operated with any amount of power (within certain limits) moreover there is an entire absence of all blowing, the gases being liberated all over the surface of the mixture.

The proportions generally used are 100 pounds of Lime to 63 pounds Coke, or 38.65% coke. This, however, is by no means constant, since it depends upon the purity of the raw materials as well as upon the amount of return mixture used. This latter, due to the fact that the return mixture contains an insufficient amount of coke.

The raw materials are accurately weighed before mixing,

so as to obtain the correct proportions. These weights are checked each day by analyzing the mixture and comparing the results. In order to clearly demonstrate the use of this method, actual copies of instructions are here given:

INSTRUCTIONS FOR MIXING

Return Mixture	*Lime*	*Coke*	*Total*	*Ratio of New Materials*
....	5,000 lbs.	3,100 lbs.	8,100 lbs.	100 to 62
1,000 lbs.	4,287 lbs.	2,713 lbs.	8,000 lbs.	100 to 63
2,000 lbs.	3,586 lbs.	2,414 lbs.	8,000 lbs.	100 to 67
3,000 lbs.	2,916 lbs.	2,084 lbs.	8,000 lbs.	100 to 71
4,000 lbs.	2,243 lbs.	1,757 lbs.	8,000 lbs.	100 to 78
7,500 lbs.	....	750 lbs.	8,250 lbs.	10 to 100

The above rules to be followed when furnaces are being fed by means of conveyors and bins overhead, no mixture from back of furnaces being fed in by hand.

When conveyors are shut down and old material from back of furnaces is being fed into furnaces by hand, new material must be wheeled from grinding plant and *thoroughly* mixed with the old mixture by means of shovels, the mixing to be done by each furnace-man in the boxes provided for this purpose. The old and new mixture must be mixed in *exactly* equal proportions.

The mixture wheeled from grinding room to be mixed as follows:

Return Mixture	*Lime*	*Coke*	*Total*	*Ratio*
....	4,480 lbs.	3,520 lbs.	8,000 lbs.	100 to 78

These instructions must be followed literally until superseded.

February 28, 1900. Superseding all previous instructions.

Wm. R. Kenan, Jr.

New mixture contains 38.27% coke.

Return mixture contains 32.00% coke.

INSTRUCTIONS FOR MIXING

Return Mixture	*Lime*	*Coke*	*Total*	*Ratio of New Materials*
....	5,000 lbs.	3,100 lbs.	8,100 lbs.	100 to 62
1,000 lbs.	4,270 lbs.	2,730 lbs.	8,000 lbs.	100 to 64
2,000 lbs.	3,540 lbs.	2,460 lbs.	8,000 lbs.	100 to 70
3,000 lbs.	2,850 lbs.	2,150 lbs.	8,000 lbs.	100 to 75
4,000 lbs.	2,160 lbs.	1,840 lbs.	8,000 lbs.	100 to 85
7,000 lbs.	....	910 lbs.	7,900 lbs.	13 lbs. per 100

The above rules to be followed when furnaces are being fed by means of conveyors and bins overhead, no mixture from back of furnaces being fed in by hand.

When conveyors are shut down and old material from back of furnaces is being fed into furnaces by hand, new material must be wheeled from grinding plant and *thoroughly* mixed with the old mixture by means of shovels, the mixture to be done by each furnace-man in the boxes provided for this purpose. The old and new mixture must be mixed in *exactly* equal proportions.

The mixture wheeled from grinding room to be mixed as follows:

Return Mixture	*Lime*	*Coke*	*Total*	*Ratio*
....	4,320 lbs.	3,680 lbs.	8,000 lbs.	100 to 85

These instructions must be followed literally until superseded.

March 4, 1900. Superseding all previous instructions.

Wm. R. Kenan, Jr.

The above figures are based upon the the assumption that all return mixture contains 30% coke. New mixture 38.27%.

INSTRUCTIONS FOR MIXING

Return Mixture	*Lime*	*Coke*	*Total*	*Ratio of New Materials*
....	5,000 lbs.	3,130 lbs.	8,130 lbs.	100 to 63
1,000 lbs.	4,240 lbs.	2,760 lbs.	8,000 lbs.	100 to 65
2,000 lbs.	3,510 lbs.	2,490 lbs.	8,000 lbs.	100 to 71
3,000 lbs.	2,840 lbs.	2,160 lbs.	8,000 lbs.	100 to 76
4,000 lbs.	2,150 lbs.	1,850 lbs.	8,000 lbs.	100 to 86
7,000 lbs.	....	980 lbs.	7,980 lbs.	14 lbs. per 100

The above rules to be followed when furnaces are being fed by means of conveyors and bins overhead, no mixture from back of furnaces being fed in by hand.

When conveyors are shut down and old material from back of furnaces is being fed into furnaces by hand, new material must be wheeled from grinding plant and *thoroughly* mixed with the old mixture by means of shovels, the mixing to be done by each furnace-man in the boxes provided for this purpose. The old and new mixture must be mixed in *exactly* equal proportions.

The mixture wheeled from grinding room to be mixed as follows:

Return Mixture	*Lime*	*Coke*	*Total*	*Ratio*
....	4,300 lbs.	3,700 lbs.	8,000 lbs.	100 to 86

These instructions must be followed literally until superseded.

March 10, 1900. Superseding all previous instructions.

Wm. R. Kenan, Jr.

New mixture contains 38.65% coke.

Return mixture contains 30.00% coke.

As to the use of alternating or direct current in the furnaces so far as the furnaces themselves and the reaction taking place in them is concerned, it makes no difference. The Carbon and Calcium which combine to form Carbide are driven into combination with each other by the sheer force and violation of the heat, obtainable only by an electric arc. There is no electrolytic action whatever in a carbide furnace. The action is brought about simply and solely by heat. If it were possible to obtain the same degree of heat in any other way, Carbide could be made in that way. The quantity, not the degree, of heat produced by any current of electricity is equal in heat units, not degrees on a thermometer, to the square of the current multiplied by the resistance of the circuit. This is true of any current whether alternating or direct and any action depending on heat is the same.

With direct current it is easier to manage the readings from the fact that calculations are free from all considerations of induction, capacity, etc., which complicate all alternating current calculations. On the other hand it is not possible by an economical means known at present, to change the voltage of a direct current; it has to be generated at the pressure it is to be used. This is a very serious objection if the current has to be transmitted any considerable distance, as it entails the installation of large heavy conductors. It requires four times the copper to transmit a given amount of power when the voltage is halved and the amperes doubled, and the losses in transmission remain the same. The principle objection to direct current, however, is the fact that every direct current machine necessarily has a commutator from which the current is taken to the stationary conductor, from the moving armature where it is generated. Commutators are a necessary evil, but they give more trouble than all else in a station. They are a constant and never ceasing source of trouble, annoyance and expense. Alternators generally generate their current at a comparatively high voltage, 2,000 volts or more. The output of a large Alternator can be carried to where it is to be used on almost any size wire

sufficiently large to give the necessary mechanical strength to support its own weight. When delivered at the place where it is to be used, the voltage can be lowered to any desired pressure with a corresponding increase in amperage by static transformers which are cheap, and having no moving parts, require no attention what-so-ever. Alternators, too, are much easier to install, easier to take care of and if anything are cheaper in first cost. A simple type, separately excited, single phase, Alternator, answers every purpose. The frequency is immaterial, 25, 60, 125 and 133 cycle have been used by the writer with equal success.

All the Alternators and all the furnaces should be operated in parallel. Should they be subdivided into units, the same applies to all the furnaces and generators composing that unit. As many furnaces as possible should compose a unit in order that the total fluctuation be minimized. The generators should be protected by some over-load device.

It is a very common, but at the same time, erroneous idea, that a given prime-mover will not burn out a generator of larger capacity than itself. This is especially true where the exciter and the Alternator are both driven from the same prime-mover. This statement is false only upon the hypothesis that the voltage be maintained; for if the voltage is low enough the current can be sufficiently increased to bring about this result, and still not go beyond the Kilowatt capacity of the Alternator. When large alternating currents are used in the furnaces, the conductors should be thoroughly interlaced in order to minimize the self induction, even in the case of short distances.

In this process we start with a fixed voltage, and let same take care of itself, regulating the amount of energy necessary by increasing or decreasing the current. It is not absolutely essential that a steady voltage be maintained, a range of ten volts being allowable. Eighty-five to ninety-five volts is by far the most satisfactory.

Especially is this true in connection with the product made and the operation of the furnace. When operating at 100 volts, an arc about three inches in length is obtained. The heat is concentrated, the furnace steady and easy to handle. With a much higher voltage, 2,000 volts or more, we can secure the same energy and of course the same number of heat units are developed, the current being lowered proportionately. The arc, however, is lengthened out to about eight inches which would be very difficult to handle. The cold material falling into the furnace would invariably blow it out. More coke is necessary to produce the same grade when the pressure is raised.

Good carbide is easily told by its large crystals. They are not always, however, of the same color, ranging from a brick-dust red to a purple, not infrequently having an irridescent appearance. It generates gas very rapidly and leaves a perfectly white residium. The Specific Gravity is 2.22.

Poor Carbide is heavier, very close grained and hard, about equal to granite, and generally the color of sandstone. The gas is generated slowly and the residium dark containing coke in the form of graphite. The scale is sometimes left on the best of carbide due to carelessness in cleaning and if tested, of course, lowers the amount of gas. This, however, is readily told; it is black and never crystalline, but sometimes shiny when containing small flakes of graphite.

I would say that for cheap production a 5,000 H.P. plant is about the minimum, 1,000 to 2,000 H.P. Plant being made to pay only under most favorable conditions.

Some idea of the cost of carbide produced by different size plants may be obtained from the following comparative figures, these being the percentages of the total cost per ton:

	Size of Plant		
	1,000 H.P.	*5,000 H.P.*	*10,000 H.P.*
Labor	37.14%	30.37%	29.12%
Mixture	31.53%	34.93%	35.75%
Power	27.77%	31.96%	29.58%
Carbons	3.56%	2.74%	2.24%

April 4, 1900.

Very truly yours,

(Signed) WILLIAM R. KENAN, JR.

Kenan Memorial Stadium

November 24, 1927

University of North Carolina

Chapel Hill, N. C.

William R. Kenan, Jr.

When the stadium was dedicated the University gave a luncheon to Mrs. Kenan and myself, at which several hundred persons were invited. At each place at the table, an attractive pamphlet was placed, containing the following information:

William Rand Kenan, Jr., unites within himself two streams of family association with the University of North Carolina that have flowed constantly since the institution was founded. On the paternal side his great-great-grandfather, James Kenan of the Wilmington District, was one of those trustees who on October 12, 1793, laid the cornerstone of Old East and shaped the course of the infant institution. One son and three great-great-grandsons of James Kenan have sat upon the Board of Trustees for a combined term of fifty-five years.

Three great-grandsons of James Kenan were graduated from the University of North Carolina. They were Thomas Stephen, A.B. 1857; James Graham, A.B. 1861; and William Rand (the father of William Rand Kenan, Jr.) A.B. 1911 "as of 1864", his fourth year having been spent in the Confederate Army rather than on the University campus.

Four of James Kenan's great-great-grandsons in a direct line have been students here. They were, Owen Hill Kenan, student 1890-1891; William Rand Kenan, Jr., B.S. 1894; Thomas Stephen Kenan, Jr., student 1895-1896; and Graham Kenan, A.B. 1904. One great-granddaughter, Mrs. Mary Lily Kenan Flagler (afterwards Mrs. Bingham) gave the Kenan Endowment Fund. Another great-granddaughter, Mrs. Graham Kenan, is the donor of the Graham Kenan Fellowship in Philosophy.

On the maternal side, his great-great-grandfather, Christopher Barbee, of Orange County, gave 221 acres of land for the campus of the University, and when some of the University land was sold in lots to secure funds for the erection of the first University building he purchased a lot. His great-granddaughter, Mary Hargrave (the mother of William Rand Kenan, Jr.) held this property until a few years ago. In the line of descent

from Christopher Barbee there have been five University alumni: Willis Barbee, student 1818; Belfield William Cave, A.B. 1848; William Frederick Hargrave, who like William Rand Kenan on account of the Civil War and his services as a soldier received the degree of A.B. in 1911 "as of 1866"; William Belfield Stewart, A.B. 1881; and William Rand Kenan, Jr., B.S. 1894.

In Wilmington, N. C., in a district in which his family had been builders of civilization, statesmen, soldiers, lawyers and business men for generations, William Rand Kenan, Jr., was born April 30, 1872. His father and his two uncles were University alumni. His mother was Mary Hargrave of Chapel Hill. His uncle, Thomas Stephen Kenan, was president of the University Alumni Association. Beginning in this fine flowering of University life, William Rand Kenan, Jr., came in contact with old family associations again when he attended Horner Military Academy in Oxford, a town where his mother had graduated from the old Oxford Female Seminary.

When, therefore, he entered the University with his class of 1894, he came to a place and an institution rich for him with the wealth of ancestral traditions and personal associations. He was literally, as well as spiritually, akin to the University. In the fellowship of campus and village, in the Sigma Alpha Epsilon Fraternity and the order of the Gimghoul, in the athletic life of football and baseball, on the varsity teams of 1893-1894, he participated joyously, gaining a richness of mind and heart that remains with him today. By the brilliance of his work as undergraduate, graduate student, and instructor, particularly by his discovery of carbide in 1893, he laid a foundation for success in chemistry, engineering, and building that was sure and rapid. One of his first professional tasks was to build and operate the first electric plant of the University.

His skill as an engineer and his ability as a director of great enterprises have been in demand literally the world over. In railway transportation, gas lighting, water and electric power,

hotel and real estate operation, he has become one of the financial and industrial leaders of his generation. He is an honored member of the American Chemical Society, the American Electrochemical Society, and the American Institute of Eectrical Engineers.

His achievements he regards with modesty; his honors he wears magnanimously, cherishing in loving memory his parents and his *alma mater* whose gracious influences are manifest in this memorial to them.

ALUMNI
OF THE KENAN FAMILY

Daniel Love Kenan
A.B. 1840

Thomas Stephen Kenan
A.B. 1857, A.M. 1858

Member of the General Assembly of North Carolina; Attorney General of North Carolina; Clerk and Reporter of the Supreme Court of North Carolina; Trustee of the University of North Carolina; President of the Alumni Association of the University of North Carolina; Colonel 43rd N. C. Regiment C. S. A.

James Graham Kenan
A.B. 1861

Member of the General Assembly; Sheriff of Duplin County; Captain 43rd N. C. Regiment C. S. A.; Lieutenant Colonel 2nd Regiment N. C. State Guards.

William Rand Kenan
A.B. 1864

Captain and Adjutant 43rd N. C. Regiment C. S. A.; Trustee of the University of North Carolina. He spent what should otherwise have been his senior year in the army of the Con-

federacy and in 1911 was granted the degree of A.B. as of 1864; Merchant of Wilmington, N. C.; the father of William Rand Kenan, Jr., who erected this stadium in loving memory of him and his wife, Mary Hargrave Kenan.

Owen Hill Kenan

Student 1890-1891

M.D. College of Physicians and Surgeons of Maryland

Physician; Member of American Ambulance Corps in France, and American Field Service with the French Army 1915-1916; Lieutenant Colonel Medical Corps 26th Division—42nd Division A. E. F.; Croix de Guerre; Member of Relief Mission to Russia and Turkey, 1919.

William Rand Kenan, Jr.

B.S. 1894

Graduate Student, Instructor in Chemistry, 1895-1896

Engineer; Discoverer of Carbide; Banker; Railroad Director; Hotel Builder; Financier. Chemist Navassa Guano Co., Wilmington, N. C., 1894; Employee N. C. Geological Survey, 1894; Professor St. Albans School, Radford, Va., 1894-1895; Builder and Operator University of North Carolina Electric Plant, 1895; Superintendent Appleton Carbide Co.; Chemical Engineer Union Carbide Co.; Employee Trader Paper Co., 1900; Consulting and Construction Engineer Florida East Coast Hotel Company; Director Flagler Railroad System; President: Citizens Gas Co., Jacksonville, Fla.; Saugerties Gas Light Co., Saugerties, N. Y.; Carolina Apartment Co., Wilmington, N. C.; Miami Electric Light and Power Co., Miami, Fla.; Miami Water Co., Miami, Fla.; West Palm Beach Co., West Palm Beach, Fla.; Florida East Coast Ry. Co.; Florida East Coast Hotel Co.; Florida East Coast Car Ferry Co.; Vice President and Treasurer Western Block Co.; Model Land Co., St. Augustine, Fla.; Trustee H. M. Flagler Estate. Member—American Chemical Society; American Electrochemical Society; American Institute of Electrical Engineers.

Thomas Stephen Kenan, Jr.

Student 1895-1896

Manufacturer; President Atlanta Cotton Oil Co., Atlanta, Ga.

Graham Kenan

A.B. 1904

Lawyer, Trustee University of North Carolina.

"The University takes pride in her long record of service to the members of this illustrious family. She has won continuity in her development and gained strength through the power which she has gathered from the Kenans: statesmen, soldiers, business men, educators, citizens, wise counselors, benefactors. Truly, there is a Kenan Tradition which is woven into the very life of the institution; and the University feels privileged to honor the Kenans, for in so doing she honors and lends strength to her own cause."

ALUMNI OF THE HARGRAVE FAMILY

Willis Barbee

Student 1818

Physician; Planter

Belfield William Cave

A.B. 1848

Lawyer

William Frederick Hargrave

A.B. 1866

Planter; First Lieutenant, Junior Reserves, C. S. A.; Captain 70th N. C. Regiment C. S. A. Because of the interruption of his studies by the Civil War he was granted his degree in 1911 as of 1866.

William Belfield Stewart

A.B. 1881

Merchant

William Rand Kenan, Jr.

B.S. 1894

KENAN MERORIAL STADIUM

In the spring of 1876, after the reopening of the University, the students organized the University Athletic Association, built a gymnasium for themselves and a playing field and began to engage in athletic sports. The games were at first intra-mural, and this intra-mural athletic life has continued vigorously ever since. In the collegiate year 1926-1927 over two thousand students engaged in intra-mural games.

Varsity terms and inter-collegiate contests grew out of this intra-mural organization. The sports became inter-collegiate at Carolina in the following order: Football, 1888; *Baseball, 1891; Track, 1900; Gymnastics, 1907; Tennis, 1908; Basketball, 1911; Wrestling, 1923; Boxing, 1926.

The other schools of the state, following the lead of the University, organized inter-scholastic sports. These sports culminated in contests held at the University to decide state championships. As these sports became state-wide in practice, popular interest began to grow and to bring numbers of spectators to the games.

While the University was small and Chapel Hill was practically inaccessible because of poor roads, the major games were played in cities where more convenient arrangements for the spectators could be made. But as interest in these sports grew it was accompanied by a desire to hold the games on the campuses of the institutions participating, until by 1914 there was a definite movement for home and home exchange of games among all the southern colleges and universities. At the same time good roads made it possible to reach Chapel Hill conveniently. The need for an athletic stadium at Chapel Hill became apparent.

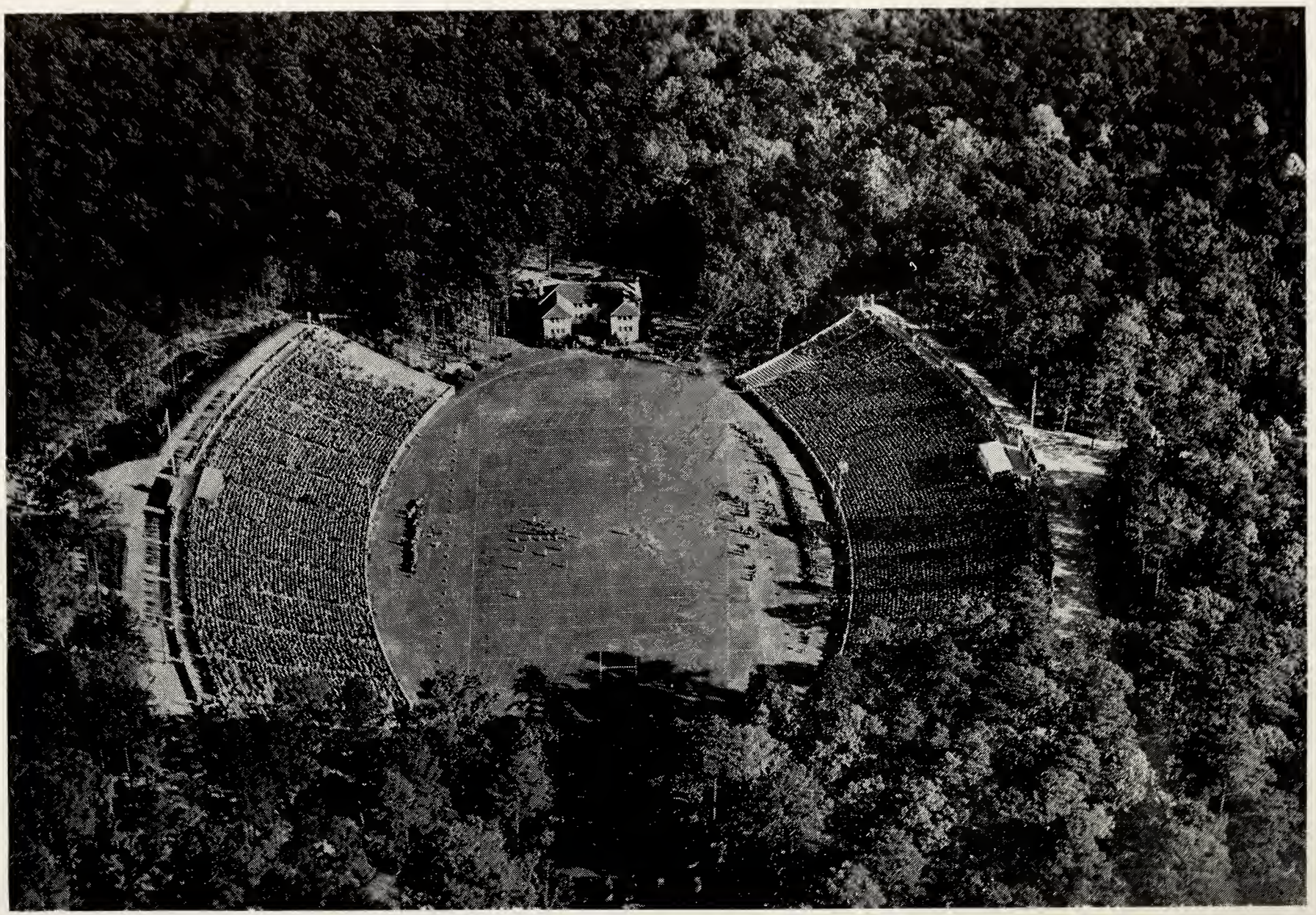
In 1914 Captain Isaac Emerson of the class of '79 met this need by giving the field which bears his name. For a time it met all demands. When the capacity of the permanent seats

*Baseball was played as early as 1866, but not as an inter-collegiate sport. Teams from Raleigh and neighboring towns were played.

was exhausted by the spectators who came to the football games, temporary wooden seats on one side and at the ends of the football field served to care for the crowds. But by 1921 the number of spectators at the football games exhausted the capacity of all wooden stands that could be built in convenient range of the field, and thereafter thousands of prospective spectators had to be turned away.

Enlargement of the concrete stands and the building of new ones at Emerson Field were carefully considered. But it became evident that a field for football, baseball, and track, on account of the large space that must be included for baseball and track, was architecturally impracticable. Permanent seats for large crowds at a football game on such a field would place the majority of the spectators out of range of the game. It was found on investigation that other large institutions had met this problem by building two fields—one for football and one for baseball and track. It was decided therefore that Emerson Field should be retained for baseball and track and that a new stadium be built for football, and for use as an outdoor convocation place for pageants and like programs requiring large space combined with convenient seating arrangements.

To consider ways and means of meeting this situation a group of University alumni met at the Washington Duke Hotel in Durham, May 24, 1926. Eighteen alumni here discussed the situation, decided that a stadium ought to be built, and formed a committee to present the need and a plan of action to the alumni. The committee consisted of Robert Lassiter, Chairman, Foy Roberson, Secretary, Kemp P. Lewis, L. P. McLendon, J. L. Morehead, and G. W. Hill. They reported a plan of building a stadium by alumni subscription to the meeting of alumni in Chapel Hill, June 1926. Their plan was adopted by the alumni and ratified by the Trustees, and they were placed in charge of proceedings. Immediately they issued a prospectus of a stadium and a plan of financing it. The records show that by September 10, 1926, $27,926 had been subscribed by the following alumni:



Kenan Stadium
University of North Carolina

F. C. Cochran, W. P. Jacocks, The Class of '26; J. L. Morehead, J. F. Patterson, L. C. Groves, G. G. Gallaway, Dr. Frederic M. Hanes, W. L. Long, P. R. McFayden, L. J. Phipps, Frank Coxe, Charles Bruce Webb, William Dunn, Jr., A. L. M. Wiggins, Max T. Payne, S. W. Minor, Alton H. Robinson, J. M. Wiggins, Claude W. Rankin, W. F. Strowd, Bowman Gray, Graham Woodard, Hugh B. Hester, Robert H. Welch, Jr., A. H. Hoyle, R. P. Brooks, Jr., W. E. White, Jr., A. M. Worth, Isaac Schwartz, C. O. Stout, H. C. Seawell, C. B. Ruffin, J. Roy Moore, J. J. O'Brien, J. M. Morehead, C. S. Kurfees, J. K. Norfleet, Robert O. Holt.

In the meantime, in June 1926, a copy of this prospectus and plan of financing the stadium came into the hands of William Rand Kenan, Jr., who immediately expressed his interest in it and his readiness to cooperate on the same basis as the other alumni. Mr. Kenan, however, was already considering establishing at the University some form of memorial to his father and mother. The pressing need of the University for a stadium and the possibilities of beauty, dignity, and permanence it presented, suggested to him that the benefaction he contemplated might well take the form of a memorial stadium.

With fine modesty and tact he indicated to the stadium committee the attraction the idea held for him. But at the same time he deferred to the whole body of alumni should they desire to erect the stadium according to the original plan. In case they should, he reiterated his desire to contribute on the same basis as the others. Should the alumni prove willing for him to do so, however, he indicated his desire to build the stadium as a memorial to his father and mother. The Stadium Committee cleared the point immediately by unanimously approving the construction by him of a stadium of 24,000 capacity as a memorial to his father and mother. As soon as possible thereafter Mr. Kenan visited Chapel Hill for a personal examination of the site proposed for the stadium and to ascertain the University's means for constructing it. This was a visit of one day, November 13,

1926. On this same day he expressed himself as satisfied with the project and formally announced his gift of $275,000 to carry it out.

The Stadium Committee for the Alumni, and the Executive Committee of the Trustees accepted his gift officially. And at the annual meeting of the Trustees, January 25, 1927, the full Board of Trustees ratified the act by the following resolution:

"On November 13, 1926, William Rand Kenan, Jr., a distinguished and loyal son of the University of the Class of 1894, gave to his *alma mater* the sum of Two Hundred and Seventy-Five Thousand Dollars with which to construct on the grounds of the University a stadium, as a memorial to his mother, Mary (Hargrave), and his father, William Rand Kenan.

"The gift was accepted for the University by a duly authorized committee of alumni. The site of the stadium was chosen by the Building Committee of the Trustees. And in a natural ravine in the forest just south of the southern boundary of the campus work is actively progressing on the stadium, known and designated as the *Kenan Memorial Stadium.*

"Adapting itself to the natural forest beauty of Chapel Hill the stadium will enhance the dignity and charm of the growing University. It will make possible the wholesome growth of the whole athletic program of the University. It will bring into the beauty of out-of-doors such activities as plays, pageants, community festivals, commencement and University Day celebrations. And thus in symmetry, beauty, and usefulness it will day by day memorialize in terms of a more abundant University life the affection of this loyal son for his parents and his *alma mater*—a symbol of a fine spirit in magnificent action.

"We, the full Board of Trustees, therefore, in regular session desire hereby to express our appreciation of the gift and our joy in the loyalty and affection which prompted it. And by unanimous action we ratify and confirm the action of the Alumni Committee and of the Building Committee, gladly

affirming our purpose to preserve the stadium in dignity and beauty as a memorial of the abiding affection of the donor for the University, and his parents, Mary (Hargrave) and William Rand Kenan."

In a natural valley about two thousand feet from the center of the campus of the University of North Carolina and just above the spot long known as The Meeting of the Waters, there is a natural amphitheatre, easily approached by paths that follow the lay of the land. The brook that flows through this valley has cut a ravine so that the floor of the stream is level and smooth and the banks rise with equal steepness on either side. Here is the site of the Kenan Memorial Stadium, designed by Atwood and Nash and built by T. C. Thompson and Brothers. The object of the designers was to adapt the structure to the natural forest and stream beauty of the location.

Accordingly the brook has been led through a concrete culvert and above it the ground has been built up to form the playing field. The sides of the hills have been hollowed out to give space for the oval lines of the seat banks on either side of the field. The valley has been left open to the west and only partially closed by the field house to the east, so that its lines remain intact and blend with those of the stadium. The forest surrounding the ravine has been preserved; the stadium terrace and plantings have been designed to blend with it. And the paths to the stadium wind through the forest and over bridges of stone to the brink of the valley from which, beginning at the level of the rim, the stadium drops away in smoothly curving lines to the field below.

The field runs roughly east and west and the seat banks are built in duplicate structures on either side, with planted terraces sloping down from the end walls to a gateway on the western end of the field and to a field house on the eastern end. The shape of the whole structure is an oval cut across at each end.

The gate to the playing field is not used for the entrance of spectators to the stadium, but for the use of processions entering the field itself. But it is used at the end of the games to facilitate quickly emptying the stadium. There are two main entrances for spectators, one for each side of the stadium, centrally placed in the rear of each seat bank. Opposite each of these entrances is erected a memorial to William Rand Kenan and Mary Hargrave Kenan. The memorial is a bronze tablet set on the face of a limestone pedestal, surmounted by a forty-foot mast. In front of this is a semi-circular plaza leading to the two central aisles. Just back of the memorial on one side of the field is the guest box, and back of the memorial on the other side is the press box.

A gravelled walk on either hand leads to the promenade built along the outer rim of the stadium. From the promenade twelve aisles lead to the seats. The seat bank is a series of concrete steps built into the hillside, each bank seating twelve thousand spectators. The seat bank is constructed on a curve so that each spectator commands all parts of the field. The seats of fir-wood supported on iron pedestals are painted to harmonize with the concrete of the structure.

The playing field has been built up with cinders and gravel, thoroughly drained with tiling, covered with soil and planted. The field house is a two-story structure of brick covered with stucco. It contains full accommodations for two teams and for officials. Lavatories for the use of the public have been built in the parked place to the rear of the stadium on each side.

In the completeness and harmony of its appointments, the convenience of its seating, and the beauty of its design and location, the Kenan Memorial Stadium is unique among the stadia of America.

Construction of the stadium was begun in November 1926 and was completed in August 1927. Mr. Kenan interested himself in every detail, approved all plans, furnished the funds on

schedule as requested. But with the same courtesy and deference he had shown from the beginning, he left the whole execution to the University. On October 1, he visited the University again, inspected the completed stadium, congratulated the builders on its beauty, and gave $28,000 for the construction of the field house. His total monetary contribution has, therefore, been $303,000.

The Kenan Memorial Stadium was finely conceived, generously and magnanimously given, and beautifully completed. Though his benefaction to the University is great, and is greatly appreciated, Mr. Kenan is himself sincerely impressed by one thing alone—that he has found opportunity to express in permanent and beautiful form his love for his parents and his loyalty to Carolina.

PROGRAM OF EXERCISES

The Old North State
The University Band

Presentation of the Stadium on Behalf of the Donor
John Sprunt Hill, '89

Acceptance on Behalf of the State and University
Angus Wilton McLean, '92
Governor of North Carolina

Hark the Sound
The University Band and Assembly

Football Team of 1893

Top: *(left to right):* G. R. Little, E. R. Tull, D. A. Kirkpatrick, Walter Murphy, Thomas Sharpe, Augustus H. Price. Middle A*(left to right):* Louis I. Guion, George M. Graham, E. Y. Webb, Harry Wedbee, Alfred S. Barnard (Captain), Eugene M. Snipes. Bottom: *(left to right):* J. Guy Rankin, William R. Kenan, Jr., Charles Baskerville, William D. Merritt and James T. Pugh.

FOOTBALL TEAM OF 1893

RECORD OF THE TEAM OF 1893

Carolina	40	Washington & Lee	0
Carolina	4	V.M.I.	10
Carolina	4	Trinity	6
Carolina	60	Tennessee	0
Carolina	40	Wake Forest	0
Carolina	0	Lehigh	34
Carolina	0	Virginia	16

Carolina- Virginia Football Series

1892....	Virginia	30	Carolina	18
1892....	Carolina	26	Virginia	0

(Post Season Game in Atlanta)

1893....	Virginia	16	Carolina	0
1894....	Virginia	34	Carolina	0
1895....	Virginia	6	Carolina	0
1896....	Virginia	46	Carolina	0
1897....	Virginia	12	Carolina	0
1898....	Carolina	6	Virginia	0
1899....	No Game			
1900....	Virginia	17	Carolina	0
1901....	Virginia	23	Carolina	6
1902....	Virginia	12	Carolina	12
1903....	Carolina	16	Virginia	0
1904....	Virginia	12	Carolina	11
1905....	Carolina	17	Virginia	0
1906....	No Game			
1907....	Virginia	9	Carolina	4
1908....	Virginia	31	Carolina	0
1909....	Game cancelled on account of death of a player			
1910....	Virginia	7	Carolina	0
1911....	Virginia	28	Carolina	0

1912....	Virginia	66	Carolina	0
1913....	Virginia	26	Carolina	7
1914....	Virginia	20	Carolina	3
1915....	Virginia	14	Carolina	0
1916....	Carolina	7	Virginia	0
1917....	No Game			
1918....	No Game			
1919....	Carolina	6	Virginia	0
1920....	Virginia	14	Carolina	0
1921....	Carolina	7	Virginia	3
1922....	Carolina	10	Virginia	7
1923....	Carolina	0	Virginia	0
1924....	Virginia	7	Carolina	0
1925....	Carolina	3	Virginia	3
1926....	Virginia	3	Carolina	0

The Alumni Loyalty Fund
The University of North Carolina

TO A FEW OF THOSE INTERESTED:

The Kenan Stadium, the latest large private gift to the University, has been acclaimed everywhere as being of remarkable beauty, a fitting gem to set the wooded charm of the University campus, and, architecturally, a complement of the University's, already much enlarged and yet rapidly growing, physical plant. It was planned by the University's architectural and engineering organization, and erected under their supervision.

The story of this magnificent gift and its donor is told in the enclosed booklet, sent you through the courtesy of the University Athletic Association. We should be glad if every citizen of the State and every friend of the University might read this story, but we have only a limited issue for distribution.

This booklet does not attempt to tell of all the gifts to the University by members of the Kenan family—notable among them being the Kenan Professorship Foundation which is now providing a supplement of $75,000 per year to the salaries of a number of the members of the faculty, and the Graham Kenan Fellowship in Philosophy.

These gifts to the University from members of the Kenan family illustrate, through substantial achievement over almost a decade and a half, the important and proper place of income from private sources in the fiscal life of the University.

Interested as you are in the University, I thought you would be glad to have us send you this booklet.

Faithfully yours,

DANIEL L. GRANT, *Director.*

September, 1929.

Kenan Memorial Stadium, University of North Carolina's great stadium, dedicated just two years ago, is a pace-setter for natural beauty, in the opinion of Max Hannum, sports writer for the Pittsburgh Press. In his column recently Mr. Hannum had the following to say concerning his visit to Carolina and its stadium:

"We have been privileged to see many of the beautiful football stadiums of the country, including Rose Bowl, at Pasadena, and others, but none can even approach the one of the University of North Carolina campus at Chapel Hill. Where some of the gridiron structures run to massiveness, attempting to draw attention to their imposing grandeur, the simple setting, clever architecture, and splendid arrangement of the Tar Heel Bowl could hardly be matched.

"It is a little gem, set in a natural depression of the heart of a pine forest. You walk over North Carolina's campus, passing among fine new buildings and others erected in 1822, follow signs that direct you to the stadium, and are unaware of its proximity until it looms before you through the pine trees. They surround it upon all sides. It sits in the little valley, with concrete stands on either side, and entrance at one end and a wonderfully appointed field house at the other.

"The green turf, the luxurious landscaping and the blue sky make a sight that is not easily forgotten."